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NATIONAL DAM SAFETY PROGRAM. SKYLINE LAKE DAM NUMBER 1 (NJ00203--ETC(U)
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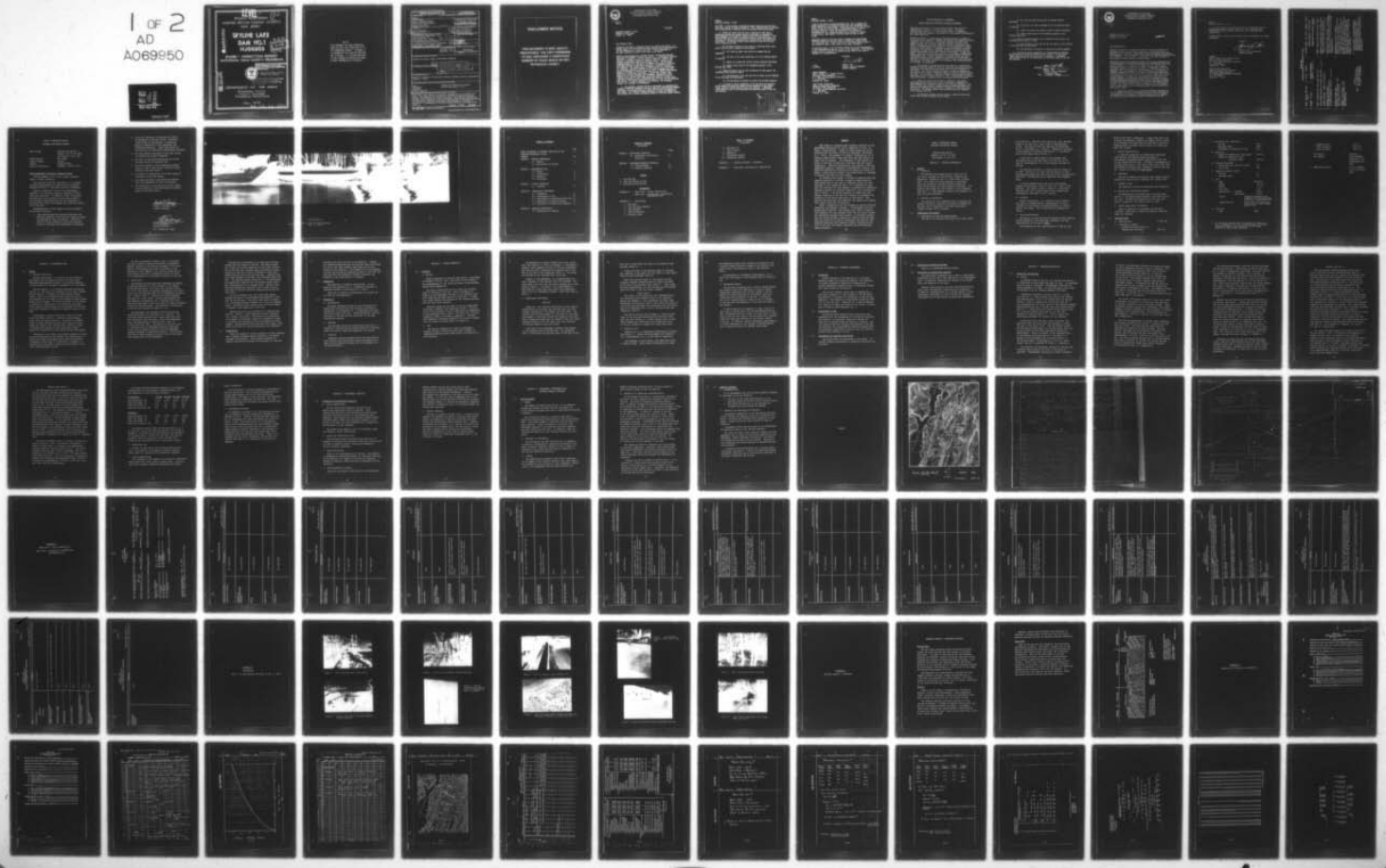

LEVEL III

PASSAIC RIVER BASIN

SHEPARD BROOK, PASSAIC COUNTY

NEW JERSEY

SKYLINE LAKE
DAM NO.1
NJ00203

PHASE 1 INSPECTION REPORT
NATIONAL DAM SAFETY PROGRAM

Approved for public release;
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DEPARTMENT OF THE ARMY

Philadelphia District
Corps of Engineers
Philadelphia, Pennsylvania

May, 1979

SECURITY CLASSIFICATION OF THIS PAGE (When Date Entered)

REPORT DOCUMENTATION PAGE	READ INSTRUCTIONS BEFORE COMPLETING FORM
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4. TITLE (and Subtitle): Phase I Inspection Report National Dam Safety Program Skyline Lake Dam No. 1 Passaic County, N.J. HA-A 069615	5. TYPE OF REPORT & PERIOD COVERED: (9) FINAL rept.
	6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s): (10) Robert J. Jenny, P.E.	8. CONTRACT OR GRANT NUMBER(s): (15) DACW61-78-C-0124
9. PERFORMING ORGANIZATION NAME AND ADDRESS: Jenny-Leedshill Engineering, 318 South Orange Ave., South Orange, N.J. 07079 — New Jersey State Dept. of Environmental Protection-Trenton	10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS: U.S. Army Engineer District, Philadelphia, Custom House, 2d & Chestnut Streets, Philadelphia, Pennsylvania 19106 (11)	12. REPORT DATE: May 79
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18. SUPPLEMENTARY NOTES

Copies are obtainable from National Technical Information Service, Springfield, Virginia, 22151.

19. KEY WORDS (Continue on reverse side if necessary and identify by block number)

Dams
Embankments
Spillways
Visual inspection
National Dam Inspection Act Report
Skyline Lake Dam No. 1, N.J.

20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

This report cites results of a technical investigation as to the dam's adequacy. The inspection and evaluation of the dam is as prescribed by the National Dam Inspection Act, Public Law 92-367. The technical investigation includes visual inspection, review of available design and construction records, and preliminary structural and hydraulic and hydrologic calculations, as applicable. An assessment of the dam's general condition is included in the report.

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DEPARTMENT OF THE ARMY
PHILADELPHIA DISTRICT, CORPS OF ENGINEERS
CUSTOM HOUSE—2D & CHESTNUT STREETS
PHILADELPHIA, PENNSYLVANIA 19106

IN REPLY REFER TO

NAPEN-D

7 JUN 1979

Honorable Brendan T. Byrne
Governor of New Jersey
Trenton, NJ 08621

Dear Governor Byrne:

Inclosed is the Phase I Inspection Report for Skyline Lake Dam No. 1 in Passaic County, New Jersey which has been prepared under authorization of the Dam Inspection Act, Public Law 92-367. A brief assessment of the dam's condition is given in the front of the report.

Based on visual inspection, available records, calculations and past operational performance, Skyline Lake Dam No. 1, a high hazard potential structure, is judged to be in fair overall condition. However, the spillway is considered seriously inadequate since 16 percent of the Probable Maximum Flood (PMF) would overtop the dam. The seriously inadequate spillway is assessed as an UNSAFE, non-emergency condition, until more detailed studies prove otherwise or corrective measures are completed. The classification of UNSAFE applied to a dam because of a seriously inadequate spillway is not meant to indicate the same degree of emergency as would be associated with an UNSAFE classification applied for a structural deficiency. It does mean, however, that based on an initial screening, and preliminary computations, there appears to be a serious deficiency in spillway capacity so that if a severe storm were to occur, overtopping and failure of the dam would take place, significantly increasing the hazard to loss of life downstream from the dam. To insure adequacy of the structure, the following actions, as a minimum, are recommended:

a. The spillway's adequacy should be determined by a qualified professional consultant engaged by the owner using more sophisticated methods, procedures, and studies within six months from the date of approval of this report. Any remedial measures necessary to insure the adequacy of the spillway and to prevent overtopping should be initiated within calendar

year 1980. In the interim, a detailed emergency operation plan and warning system, should be promptly developed. Also, during periods of unusually heavy precipitation, around-the-clock surveillance should be provided.

b. Within six months from the date of approval of this report, engineering studies and analyses should be performed to determine the dam's embankment and foundation condition and structural stability. This should include test borings to determine material properties relative to stability and seepage and installation of piezometers to facilitate seepage studies. Any remedial measure found necessary should be initiated within calendar year 1980.

c. The following remedial actions should be completed within three months from the date of approval of this report:

(1) All brush and small trees should be removed from the embankment.

(2) The hole at the right downstream toe of the spillway should be repaired.

(3) Repair the cracked and spalled concrete spillway wing walls.

(4) Repair eroded areas of the embankment adjacent to the spillway wing walls.

d. Within six months from the date of approval of this report, the following actions should be taken:

(1) The seismicity at the dam site and its effect on the stability of the dam should be investigated.

(2) The dam should be surveyed to confirm its as-built geometry.

e. A program of annual inspections of the dam should be initiated by the owners, utilizing the standard visual checklist in this report. Timely corrective action should be taken as necessary. A permanent record should be kept of all maintenance and operating events of the dam and reservoir.

NAPEN-D
Honorable Brendan T. Byrne

A copy of the report is being furnished to Mr. Dirk C. Hofman, New Jersey Department of Environmental Protection, the designated State Office contact for this program. Within five days of the date of this letter, a copy will also be sent to Congressman Robert A. Roe of the Eighth District. Under the provision of the Freedom of Information Act, the inspection report will be subject to release by this office, upon request, five days after the date of this letter.

Additional copies of this report may be obtained from the National Technical Information Services (NTIS), Springfield, Virginia 22161 at a reasonable cost. Please allow four to six weeks from the date of this letter for NTIS to have copies of the report available.

An important aspect of the Dam Safety Program will be the implementation of the recommendations made as a result of the inspection. We accordingly request that we be advised of proposed actions taken by the State to implement our recommendations.

Sincerely,

JAMES G. TON
Colonel, Corps of Engineers
District Engineer

1 Incl
As stated

Copies furnished:
Dirk C. Hofman, P.E., Deputy Director
Division of Water Resources
N. J. Dept. of Environmental Protection
P. O. Box CN029
Trenton, NJ 08625

John O'Dowd, Acting Chief
Bureau of Flood Plain Management
Division of Water Resources
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Trenton, NJ 08625

SKYLINE LAKE DAM NO. 1 (NJ00203)

CORPS OF ENGINEERS ASSESSMENT OF GENERAL CONDITIONS

This dam was inspected on 1 and 20 December 1978 by Jenny-Leedshill Engineers under contract to the State of New Jersey. The State, under agreement with the U. S. Army Engineer District, Philadelphia, had this inspection performed in accordance with the National Dam Inspection Act, Public Law 92-367.

Skyline Lake Dam No. 1, a high hazard potential structure, is judged to be in fair overall condition. However, the spillway is considered seriously inadequate since 16 percent of the Probable Maximum Flood (PMF) would overtop the dam. The seriously inadequate spillway is assessed as an UNSAFE, non-emergency condition, until more detailed studies prove otherwise or corrective measures are completed. The classification of UNSAFE applied to a dam because of a seriously inadequate spillway is not meant to indicate the same degree of emergency as would be associated with an UNSAFE classification applied for a structural deficiency. It does mean, however, that based on an initial screening, and preliminary computations, there appears to be a serious deficiency in spillway capacity so that if a severe storm were to occur, overtopping and failure of the dam would take place, significantly increasing the hazard to loss of life downstream from the dam. To insure adequacy of the structure, the following actions, as a minimum, are recommended:

a. The spillway's adequacy should be determined by a qualified professional consultant engaged by the owner using more sophisticated methods, procedures, and studies within six months from the date of approval of this report. Any remedial measures necessary to insure the adequacy of the spillway and to prevent overtopping should be initiated within calendar year 1980. In the interim, a detailed emergency operation plan and warning system, should be promptly developed. Also, during periods of unusually heavy precipitation, around-the-clock surveillance should be provided.

b. Within six months from the date of approval of this report, engineering studies and analyses should be performed to determine the dam's embankment and foundation condition and structural stability. This should include test borings to determine material properties relative to stability and seepage and installation of piezometers to facilitate seepage studies. Any remedial measure found necessary should be initiated within calendar year 1980.

c. The following remedial actions should be completed within three months from the date of approval of this report:

(1) All brush and small trees should be removed from the embankment.

(2) The hole at the right downstream toe of the spillway should be repaired.

(3) Repair the cracked and spalled concrete spillway wing walls.

(4) Repair eroded areas of the embankment adjacent to the spillway wing walls.

d. Within six months from the date of approval of this report, the following actions should be taken:

(1) The seismicity at the dam site and its effect on the stability of the dam should be investigated.

(2) The dam should be surveyed to confirm its as-built geometry.

e. A program of annual inspections of the dam should be initiated by the owners, utilizing the standard visual checklist in this report. Timely corrective action should be taken as necessary. A permanent record should be kept of all maintenance and operating events of the dam and reservoir.

APPROVED: _____

JAMES G. TON
Colonel, Corps of Engineers
District Engineer

DATE: 4 Jun 1979

DEPARTMENT OF THE ARMY
PHILADELPHIA DISTRICT, CORPS OF ENGINEERS
CUSTOM HOUSE—2 D & CHESTNUT STREETS
PHILADELPHIA, PENNSYLVANIA 19106

IN REPLY REFER TO

NAPEN

Honorable Brendan T. Byrne
Governor of New Jersey
Trenton, NJ 08621

17 MAY 1979

Dear Governor Byrne:

This is in reference to our ongoing National Program for Inspection of Non-Federal Dams with the State of New Jersey. Skyline Lake Dam No. 1 (Federal I.D. No. NJ00203), a high hazard potential structure has recently been inspected. The dam is owned by the Skyline Lake Property Owners Associati and is located on Shephard Brook approximately a half mile northeast of the Borough of Wanaque-Midvale in Passaic County.

Using Corps of Engineers screening criteria, it has been determined that the dam's spillway is seriously inadequate since approximately 16 percent of the Probable Maximum Flood would overtop the dam. The seriously inadequate spillway is assessed as an UNSAFE, non-emergency condition, until more detailed studies prove otherwise, or corrective measures are completed. The classification of UNSAFE applied to a dam because of a seriously inadequate spillway is not meant to indicate the same degree of emergency as would be associated with an UNSAFE classification applied for a structural deficiency. It does mean, however, that based on an initial screening and preliminary computations, there appears to be a serious deficiency in spillway capacity so that if a severe storm were to occur, overtopping and failure of the dam could take place, significantly increasing the hazard potential to loss of life downstream from the dam. As a result of this UNSAFE determination, it is recommended that the dam's owner take the following measures within 30 days of the date of this letter:

a. Engage the services of a qualified professional consultant to more accurately determine the spillway adequacy by using more detailed and sophisticated hydrologic and hydraulic analyses, and to recommend any remedial measures required to prevent overtopping of the dam.

NAPEN-D
Honorable Brendan T. Byrne

b. In the interim, a detailed emergency operation plan and downstream warning system should be developed. Also, round-the-clock surveillance should be provided during periods of unusually heavy precipitation.

A final report on this Phase I Inspection will be forwarded to you within two months.

Sincerely,

JAMES G. TON
Colonel, Corps of Engineers
District Engineer

Cy Furn:
Dirk C. Hofman, Actg Deputy Director
Divsion of Water Resources
N. J. Dept of Environmental Protection
P. O. Box CN029
Trenton, NJ 08625

John O'Dowd, Acting Chief
Bureau of Flood Plain Management
Division of Water Resources
N. J. Dept of Environmental Protection
P. O. Box CN029
Trenton, NJ 08625

UNSAFE DAM
NATIONAL PROGRAM OF INSPECTION OF DAMS

a. NAME: Skyline Lake Dam No. 1

b. ID NO.: NJ00203

c. LOCATION State: New Jersey County: Passaic
River or Stream: Shepard Brook
Nearest D/S City or Town: Wanaque-Midvale

d. HEIGHT: 16 feet

e. MAXIMUM IMPOUNDMENT CAPACITY: 150 ac. ft.

f. TYPE: Earthfill with steel sheet pile core

g. OWNER: Skyline Lake Property Owners Assoc.

h. DATE GOVERNOR NOTIFIED OF UNSAFE CONDITIONS: 17 May 78.

i. CONDITION OF DAM RESULTING IN UNSAFE ASSESSMENT: Preliminary report calculations indicate 16% of PMF would overtop the dam.

l. URGENCY CATEGORY: UNSAFE, Non-emergency

m. EMERGENCY ACTIONS TAKEN:
Gov. notified of this condition by District Engineer's letter of 17 May 78.

j. DESCRIPTION OF DANGER INVOLVED: Overtopping and failure of the dam significantly increases hazard potential to loss of life and property downstream of dam.

n. REMEDIAL ACTIONS TAKEN:
N.J.D.E.P. will notify dam's owner upon receipt of our letter

k. RECOMMENDATIONS GIVEN TO GOVERNOR:
Within 30 days of date of District Engineer letter the owner do the following:
a. Engage the services of a qualified professional consultant to more accurately determine the spillway adequacy by using more detailed and sophisticated hydrologic and hydraulic analyses, and to recommend any remedial measures required to prevent overtopping of the dam.

o. REMARKS: Final report, to be issued within six weeks, will have WHITE cover.

b. In the interim, a detailed emergency operation plan and downstream warning system should be developed. Also, around-the-clock surveillance should be provided during periods of unusually heavy precipitation.

for W. H. Zink
W. H. ZINK, Coordinator
Dam Inspection Program
U.S.A.E.D., Philadelphia

PHASE I INSPECTION REPORT

NATIONAL DAM SAFETY PROGRAM

Name of Dam:	Skyline Lake Dam No. 1 Federal I.D. No. NJ 00203 New Jersey I.D. No. 399
State Located:	New Jersey
County Located:	Passaic
Stream:	Shephard Brook
Dates of Inspection:	December 1 and 20, 1978

Brief Assessment of General Condition of Dam

The dam appears to be in fair overall condition based on visual inspection.

The spillway of Skyline Lake Dam No. 1 is capable of passing approximately 15 percent of the Probable Maximum Flood and is considered seriously inadequate.

There is evidence of erosion of the embankment adjacent to the spillway wingwalls exposing the steel sheet pile core wall. In addition, there is cracking and spalling of the concrete spillway and wingwalls. The available engineering data are not sufficient to quantitatively analyze the seepage and structural stability of the dam.

Recommendations and the urgency of their implementation are as follows:

1. More sophisticated and detailed hydrologic and hydraulic analyses of the spillway capacity should be performed as soon as possible. From this, a positive action program of corrective measures should be developed and implemented as necessary.

2. Field and laboratory investigations should be performed in the near future, including installation of piezometers, to determine physical properties of the embankment and foundation materials. These data should be evaluated by an experienced geotechnical engineer.

3. The dam should be surveyed in the near future to confirm its as-built geometry.

4. The hole at the right downstream toe of the spillway should be repaired soon.

5. A warning system to alert downstream inhabitants in case of dam failure should be implemented in the near future.

6. A program of inspections of the dam should be initiated in the near future.

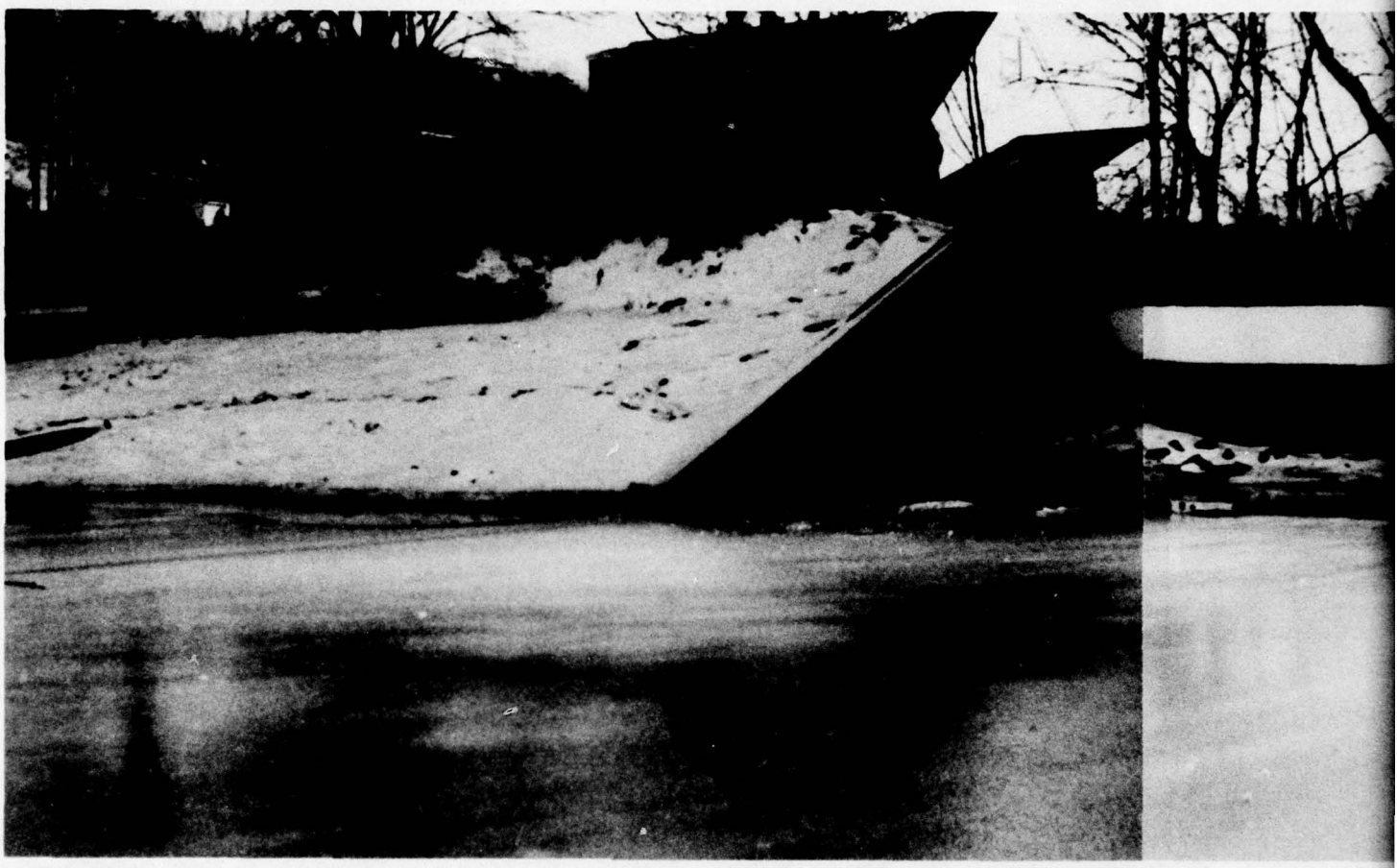
7. All brush and small trees should be removed from the embankments as soon as possible.

8. The seismicity at the dam site and its effect on the stability of the dam should be investigated in the near future.

Frank L. Panuzio

Frank L. Panuzio, P.E.
Project Engineer

Robert J. Jenny, P.E.
Project Director
N.J. License No. 9878



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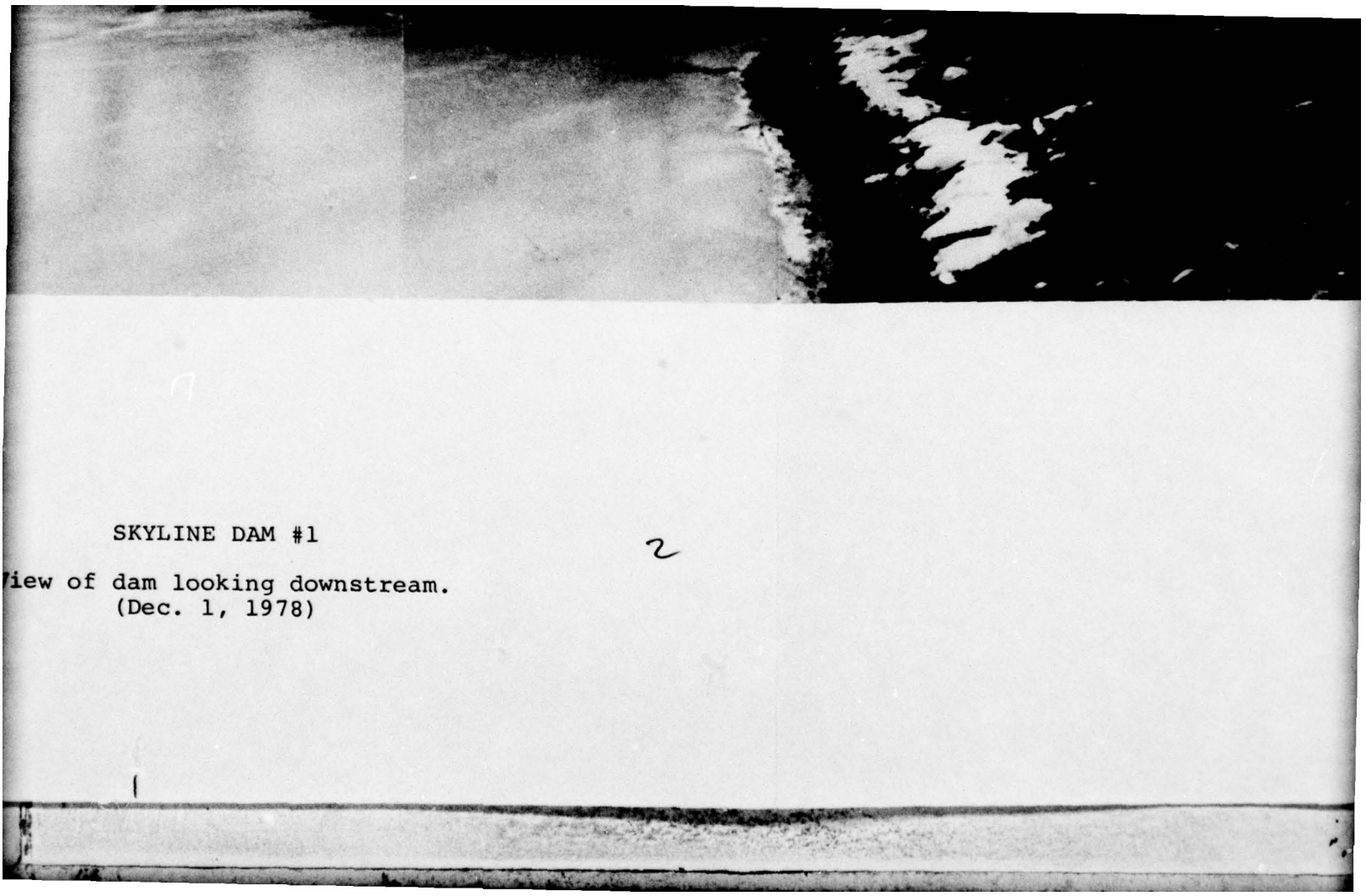

SKYLINE DAM #1

2

iew of dam looking downstream.
(Dec. 1, 1978)

1

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PREFACE

This report is prepared under guidance contained in the Recommended Guidelines for Safety Inspection of Dams, for Phase I Investigations. Copies of these guidelines may be obtained from the Office of Chief of Engineers, Washington, D. C. 20314. The purpose of a Phase I Investigation is to identify expeditiously those dams which may pose hazards to human life or property. The assessment of the general condition of the dam is based upon available data and visual inspections. Detailed investigation, and analyses involving topographic mapping, subsurface investigations, testing, and detailed computational evaluations are beyond the scope of a Phase I investigation; however, the investigation is intended to identify any need for such studies.

In reviewing this report, it should be realized that the reported condition of the dam is based on observations of field conditions at the time of inspection along with data available to the inspection team. It is important to note that the condition of a dam depends on numerous and constantly changing internal and external conditions, and is evolutionary in nature. It would be incorrect to assume that the present condition of the dam will continue to represent the condition of the dam at some point in the future. Only through continued care and inspection can there be any chance that unsafe conditions be detected.

Phase I inspections are not intended to provide detailed hydrologic and hydraulic analyses. In accordance with the established Guidelines, the Spillway Test flood is based on the estimated "Probable Maximum Flood" for the region (greatest reasonably possible storm runoff), or fractions thereof. The test flood provides a measure of relative spillway capacity and serves as an aide in determining the need for more detailed hydrologic and hydraulic studies, considering the size of the dam, its general condition and the downstream damage potential.

PHASE I INSPECTION REPORT
NATIONAL DAM SAFETY PROGRAM

SKYLINE LAKE DAM NO. 1
Federal I.D. No. NJ 00203
New Jersey I.D. No. 399

SECTION 1: PROJECT INFORMATION

1.1 General

a. Authority

The National Dam Inspection Act, Public Law 92-367, 1972, provides for the National Inventory and Inspection Program by the U. S. Army Corps of Engineers. This report has been prepared in accordance with this authority, through contract between the State of New Jersey and Jenny-Leedshill Engineers. The State of New Jersey has also entered into an agreement with the U. S. Army Engineer District, Philadelphia, to have this work performed.

b. Purpose of Inspection

The purpose of this inspection was to evaluate the general structural integrity and hydraulic adequacy of the dam, and to determine if the dam constitutes a hazard to human life or property.

1.2 Description of Project

a. Description of Dam and Appurtenances

The dam is an earthfill structure with a steel sheet

pile core wall. The dam is 210 feet long, has a maximum height of 16 feet and a crest width of approximately 8 feet. The slope of both the upstream and downstream face is 2 horizontal on 1 vertical. Immediately upstream of the reservoir is Skyline Lake Dam No. 2, a structure built at the same time as Dam No. 1.

A core wall of steel sheet piling extends along the center line of the dam crest, from the top of the crest to approximately 8 to 10 feet beneath the base of the dam.

The spillway structure is located near the center of the dam. The weir is 50 feet long and there is 4 feet of freeboard between the crest and top of the concrete spillway walls. The spillway has an Ogee weir and a masonry apron.

A 20-inch diameter cast iron outlet pipe passes beneath the dam about 20 feet to the left (east) of the spillway. The control valve is housed in a reinforced concrete well with a steel manhole cover located just downstream of the center line of the dam.

b. Location

Skyline Lake Dam No. 1 is located in north central New Jersey on Shephard Brook, approximately 1/2 mile northeast of the Borough of Wanaque-Midvale, in Passaic County, New Jersey. The vicinity map is presented on Plate 1.

c. Size Classification

The dam is 16 feet high and the maximum storage capacity of the reservoir is 150 acre-feet; therefore, the size classification of the dam is small.

The criteria for size classification of dams are set

forth in the Corps' Guidelines. A small size dam is one in which the reservoir capacity is greater than or equal to 50 acre-feet and less than 1000 acre feet, and/or the maximum height is greater than or equal to 25 feet and less than 40 feet.

d. Hazard Classification

A road and playground are immediately downstream from the dam, and several houses and roads in the Borough of Wanaque-Midvale (population 8,500) are in the downstream flood path. Failure or misoperation of the dam could result in the loss of more than a few lives and excessive economic loss; therefore, Skyline Lake Dam No. 1 should be classified high hazard.

e. Ownership

The dam is owned by the Skyline Lake Property Owners Association, Skyline Lake, Ringwood, New Jersey 07456.

f. Purpose of Dam

The reservoir is used for aesthetics and recreation.

g. Design and Construction History

The application for construction of Skyline Lake Dam No. 1, including design drawings, was filed on June 29, 1945. The dam was constructed in 1945 and 1946 and was accepted by the State on May 14, 1946.

h. Normal Operational Procedures

There is typically no regulation of the dam or reservoir, other than to drain the reservoir every few years for cleaning.

1.3 Pertinent Data

a. Drainage Area	2.9 sq. mi.
b. Discharge at Damsite	
. Ungated spillway capacity at maximum pool elevation	1400 cfs

c. Elevation (ft. above MSL)*

. Top dam	272.3
. Spillway crest	268.3
. Streambed at centerline of dam	256.3

d. Reservoir

. Length of maximum pool (dam crest)	1700 ft.
. Length of recreation pool (spillway crest)	1600 ft.

e. Storage (acre-feet)

. Recreation pool (spillway crest)	85
. Top of dam	150

f. Reservoir surface (acres)

. Top dam	16
. Spillway crest	12

g. Dam

. Type	Earthfill
. Length	210 ft.
. Height	16 ft.
. Top width	8 ft.
. Side slopes - upstream	2H:1V
- downstream	2H:1V
. Zoning	Impervious earthfill upstream of core and pervious earthfill on downstream side.
. Impervious core	Steel sheet pile core wall driven 8 to 10 feet beneath base of dam.

h. Spillway

. Type	Ogee

* A contour map prepared for the dredging of Reservoir No. 2, dated Jan. 31, 1978, indicates that 158.3 feet should be added to the elevations on the design drawings to obtain MSL elevations.

	. Length of weir	50 ft.
	. Crest elevation	268.3 ft.
	. Apron elevation	259.3 ft.
	U/S Channel	Reservoir
	D/S Channel	Stone pavement extending 10 ft. downstream from weir.
i.	Regulating Outlets	20 in. diameter cast iron outlet pipe.

SECTION 2: ENGINEERING DATA

2.1 Design

a. Geologic Conditions

Skyline Lake Dam No. 1 is located in north-central New Jersey near the eastern border of the New Jersey Highlands physiographic province. The regional geology of this province is discussed in Appendix C to this report.

Skyline Lake No. 1 is situated downstream of Skyline Lake No. 2, just below the confluence of two small streams. Skyline Lake No. 2 occupies the more easterly stream valley. Both of the streams entering Skyline Lake No. 1 are presently far too small to have eroded the deep valleys which they now occupy. The width and depth of the valleys is primarily a reflection of the erosion by the continental glaciers which gouged out and scraped off the overlying soft materials to expose the bedrock in much of the area.

Considering a section across the valley at the dam site, the Skyline Lake No. 1 occupies a much broader valley than the upper reservoir. No bedrock is exposed close to either abutment and the valley walls are less steep than those on the upstream dam. However, it must be assumed that because of their proximity, granite gneiss also underlies this dam and the valley side slopes.

Overburden in the valley is probably composed of recent alluvium and glacial tills; however, the construction of houses with lawns and gardens has altered the original topography so much that it is difficult to observe. No indications of the depth to bedrock are available in the valley bottom beneath the dam.

The dam is situated in Seismic Zone 1, indicating only minor potential damage from distant earthquakes. However, because of the relative closeness of the seismically active Ramapo Fault and the location of the reservoir in what appears to be a valley controlled by the geologic structure, consideration should be given to an investigation of the seismic stability of the dam.

b. Design Data

The existing and available data regarding the design of Skyline Lake Dam No. 1 are included in the "Report on Dam Application No. 398" filed with the State June 29, 1945. Two sheets of drawings accompanying this application show sections and plans of the embankment and spillway. (Plates 2 and 3). Elevations on these drawings are based on a local datum. Contour maps prepared for the excavation of Reservoir No. 2 indicates that 158.3 feet should be added to the local datum to obtain elevations relative to Mean Sea Level. The permit for construction of the dam was approved on August 2, 1945.

The embankment was designed to have upstream and downstream slopes of 2 horizontal on 1 vertical. The available design drawings show a steel sheet pile core wall extending along the center line of the embankment crest and penetrating to elevation 250.3 MSL, or 22 feet below the crest. The section of the dam (Plate 3) indicates that the embankment material downstream of the core is pervious earthfill and the embankment material upstream is impervious earthfill. This section also shows riprap extending from the crest 18 feet down the upstream face of the embankment.

The spillway was designed as an ogee type structure located near the center of the dam. The design called for a sheet pile cutoff extending 10 feet below the bottom of the weir and a masonry apron consisting of stones one foot in size set in grout, extending 10 feet downstream from the toe of the spillway weir. Concrete wingwalls were designed to provide 4 feet freeboard above the weir. The spillway design flood flow is 295 second-feet per square mile, based on the 125% Central Jersey Curve and a drainage area of 2.9 square miles. Based on this flow the spillway was specified to be 50 feet long by 4 feet high to provide a one-foot freeboard above the design flood.

A 20-inch diameter cast iron outlet pipe passes beneath the base of the embankment approximately 20 feet east of the spillway. The outlet pipe valve is housed in a reinforced concrete chamber with a cast iron manhole cover. The design plans indicate that the valve chamber is located at the centerline of the dam.

I Specifications for the construction of Skyline Lake Dams No. 1 and No. 2 were prepared by Newell Harrison, P.E., Butler, New Jersey. The earthfill was specified to be placed in horizontal layers not exceeding 6 inches in thickness and thoroughly rolled and tamped with heavy rammers. Specifications were also given for riprap, steel sheet piling and for concrete preparation and placement.

2.2 Construction

Seven dam inspection reports prepared by State engineers and 16 monthly progress reports prepared by the design engineer are available. These reports describe the general construction progress and performance of the dam

following the first filling of the reservoir. Seepage was observed downstream from the spillway apron and around the toe of the right wingwall soon after the initial filling of the reservoir. The seepage was not considered critical and the dam was approved on May 14, 1946 with the provision that the seepage be checked frequently and reported to the State should it increase.

2.3 Operations

The reservoir is normally uncontrolled. It was repcrted that Reservoir No. 2, immediately upstream is sometimes lowered in anticipation of a storm.

There are no records of maintenance of the dam, nor is there any instrumentation.

2.4 Evaluation

a. Availability

Available engineering data for the dam consist of design plans and sections which include a qualitative description of the material in the embankment and specified steel sheet pile size. Specifications for the construction of the dam are also available, as are some construction reports.

b. Adequacy

The available design and construction data are inadequate to evaluate the structural stability of the dam, since the as-built materials properties are unknown.

c. Validity

Inspection reports prepared during the dam construction indicate that the dam was constructed generally as shown on the available drawings and in accordance with the specifications.

SECTION 3: VISUAL INSPECTION

3.1 Findings

a. General

Visual inspections of Skyline Lake Dam No. 1 were made on December 1 and 20, 1978. The level of the reservoir was approximately 5.7 ft. below the crest of the spillway during these inspections.

The visual inspections did not reveal any critical signs of distress in the dam. There is evidence of erosion of the embankment adjacent to the spillway wing-walls exposing the steel sheet pile core wall. In addition, some cracking and spalling of the concrete spillway and wing walls were observed.

Detailed inspection was made of the dam, appurtenant structures, reservoir and downstream channel. Descriptions of the findings of those inspections are summarized in the paragraphs which follow. The check list of visual inspection items is included in Appendix A. Geologic and foundation conditions observed at the time of inspection are noted in greater detail in Section 2.

b. Dam

The dam was inspected for signs of settlement, seepage, erosion, cracking and any other evidence of undesirable behavior which might affect the stability of the structure.

The embankment is partly covered with grass, brush and a few trees up to 1-foot in diameter. A residential property fence extends over part of the east embankment and snow was partly obscuring the upstream face of the dam at the time of the inspection (Photo 1). No riprap was observed on the upstream face of the dam.

Erosion of the embankment, to a maximum depth of 1 foot, adjacent to the spillway walls was observed. The steel sheet pile core wall was partly exposed due to this erosion (Photo 2). An erosion scar approximately 2 feet deep and 4 feet wide was noted at the downstream side of the east embankment abutment (right hand side of Photo 3).

c. Appurtenant Structures

Spillway

There are five vertical construction joints equally spaced along the concrete ogee spillway weir with discernable separation in all except the right joint. The center joint has been eroded to 1 inch wide at the crest and appears to have been filled with asphalt at one time. Minor leakage was noted near the bottom of the left joint. Seepage through all but the right joint was indicated by leaching deposits along the joints.

Some debris and considerable sediment were present on the upstream side of the spillway. The sediments were 3.5 feet below the spillway crest at the ends of the

weir and 6.2 feet below the crest at the center of the spillway (Photo 5).

A hole was noted in the spillway apron at the Ogee toe, adjacent to the right wing wall where a 1-foot apron stone has been dislodged (Photo 6).

There are vertical cracks in the centers of both concrete wingwalls extending from the top of the walls to the top of the spillway crest (Photo 7). Both cracks are open approximately 1/4 inch and spalling has occured along the crack in the left (east) wingwall.

Outlet Works

The intake to the outlet pipe was submerged during the inspections and therefore could not be observed. During the December 1, 1978 inspection the water level downstream of the dam was about 1 foot above the invert of the outlet pipe and water was discharging from the outlet pipe at an estimated rate of 100 to 150 gpm during the inspection (Photo 3).

The top of the gate valve chamber is located at the crest of the dam just downstream from the steel sheet pile core wall (Photo 2). A steel manhole cover on the valve chamber was locked during the inspection, thus it was not possible to inspect the outlet gate valve.

d. Reservoir Area

Reservoir No. 1 is immediately downstream of Skyline Lake Dam No. 2. Water was being pumped into Reservoir No. 1 from Reservoir No. 2 at the time of inspection.

The perimeter of the reservoir has moderately steep to gentle slopes. Single family residences with grass

and moderately wooded lawns surround the reservoir, and a heavily wooded island is located in the center of the lower third of the reservoir (Photo 3 and overview photo).

An accumulation of sediments approximately 5 to 8 feet thick was present on the upstream side of the spillway.

e. Downstream Channel

The spillway discharges into a natural stream channel the slopes of which are moderately to heavily wooded immediately downstream from the dam (Photos 3 and 10). Houses are located adjacent to the channel just downstream from both abutments of the dam. A retaining wall with a maximum height of about 5 feet is located on the west bank approximately 35 feet from the edge of the channel.

A road bridge with an opening 19.2 feet wide by 6.2 feet high is located about 300 feet downstream from the dam. Downstream from the bridge, the right bank is steep (1H:1V) and the left bank is low and level with a playing field and water tank adjacent to the channel (Photos 9 and 10). In addition, several residences approximately 0.7 miles downstream in the Borough of Wanaque-Midvale are at elevations below the maximum flood stage.

SECTION 4: OPERATION PROCEDURES

4.1 Procedures

Normal operation of the reservoir is to maintain maximum storage for recreation purposes. The reservoir is closely affected by operation of Reservoir No. 2 located immediately upstream which is reportedly lowered when large storms are anticipated.

The 20-inch diameter outlet pipe is operated by a gate valve located in a valve chamber at the dam crest. The reservoir is lowered for maintenance of the dam and reservoir. The reservoir was reportedly cleaned in 1954, 1972 or 1973 and 1974. Reservoir No. 1 must be emptied to a level at or below the intake to the Dam No. 2 outlet pipe in order to empty Reservoir No. 2.

4.2 Maintenance of Dam

The Skyline Lake Property Owners Association are responsible for the maintenance of the dam and reservoir. The reservoir is reportedly chemically treated for algae and is drained every few years for cleaning. The only records available regarding maintenance of the dam and reservoir are correspondence regarding leakage which was presumably aggravated by removing the silt from the bottom of the reservoir in 1954.

4.3 Maintenance of Operating Facilities

The outlet works are maintained by the owners. No records regarding maintenance of operating facilities are available.

4.4 Description of Warning Systems

There is no downstream warning system.

4.5 Evaluation of Operational Adequacy

The operational procedures are in need of improvement. Maintenance of the dam is poor and there is no instrumentation. In addition, there are few records of the maintenance and operation of the dam.

Regular surveillance of the dam, particularly during heavy rains and possible floods should be considered. In addition, implementation of a warning system to alert downstream inhabitants in time of floods and possible overtopping of the dam should be planned and implemented.

SECTION 5: HYDROLOGY/HYDRAULICS

5.1 Evaluation of Features

a. Design

As already stated in Section 1.2, Skyline Lake Dam No. 1 is classified as high hazard and small in size. In accordance with the Corps of Engineers' "Recommended Guidelines for Safety Inspection of Dams", the Spillway Design Flood (SDF) is selected to be the Probable Maximum Flood (PMF).

Immediately upstream of Skyline Lake No. 1 is Skyline Lake No. 2. Data obtained from State files indicate the drainage basin area is 2.8 square miles for Skyline Lake No. 2 and 2.9 square miles for Skyline Lake No. 1. As instructured by the Corps, the PMF, and fractions thereof, were developed for the 2.8 square mile basin above Skyline Lake No. 2. These flows were routed through Skyline Lake No. 2 and the outflows were used as the total PMF inflows into Skyline Lake No. 1. The 0.1 square mile intervening sub-basin was ignored in this analysis.

Elevations within the basin range from about 1150 feet above mean sea level along the perimeter to about 280 feet in the valley floor. Land use pattern within the watershed consist mainly of forested areas, with only a minor portion of the basin area being residential developments. About 0.6 percent of the watershed area is the surface of Skyline Lake No. 1 and about 1.0 percent of the watershed area is Skyline Lake No. 2. The drainage basin is delineated on a U.S.G.S. topographic map and is presented on Plate D-1, Appendix D.

The hydraulic and hydrologic features of the dam were evaluated using criteria set forth in the Corps of Engineers' "Recommended Guidelines for Safety Inspection

of Dams", and additional guidance and criteria provided by the Philadelphia District, Corps of Engineers. The Probable Maximum Precipitation (PMP) was calculated using Hydrometeorological Report No. 33 and the Hop Brook reduction factor of 0.80 for misalignment of the storm. The Probable Maximum Flood (PMF) was calculated using the Corps' computer program HEC-1, Dam Break Version. In computing the PMF the Corps requested that the SCS triangular unit hydrograph with curvilinear transformation be used. The computer program was used to calculate this unit hydrograph from the basin lag. A lag time of 1.0 hour was calculated for the basin and used in the program.

An initial infiltration loss of 1.0 inch and a final infiltration loss rate of 0.10 inch per hour were used in the HEC-1 program to give the rainfall excess. Using the excess rainfall and the unit hydrograph, the program computed the peak discharges of the 15 percent, 25 percent, 50 percent and 100 percent PMF. These discharges are approximately 1,580 cfs, 2,640 cfs, 5,270 cfs and 10,540 cfs, respectively.

The various percentages of the PMF inflow hydrograph were routed through Skyline Lake No. 2 assuming the dam does not breach. The routings were made using the Modified Puls Method by the HEC-1 program. The peak outflow discharges of the 15 percent, 25 percent, 50 percent, and 100 percent PMF were calculated to be approximately 1,470 cfs, 2,550 cfs, 5,170 cfs, and 10,430 cfs. The flood routings indicate that all floods greater than about 10 percent of the PMF will overtop the dam. A plot of percent PMF versus peak outflow discharge is presented as Plate D-2 in Appendix D.

The various percentages of the PMF outflow discharges from Skyline Lake No. 2 were routed through Skyline Lake No. 1, which is immediately downstream, using the Modified Puls Method by the HEC-1 program. The 15 percent, 25 percent, 50 percent, and 100 percent PMF peak outflow discharges from Skyline Lake Dam No.1 were calculated to be approximately 1,320 cfs, 2480 cfs, 5,110 cfs, and 10,350 cfs. These flood routings indicate that all floods greater than about 15 percent of the PMF will overtop Skyline Lake Dam No. 1 if Skyline Lake Dam No. 2 does not fail. A plot of percent PMF versus peak outflow discharge from Skyline Lake Dam No. 1 is presented as Plate D-5 in Appendix D.

Because the spillways for both Skyline Lake Dam No. 2 and Skyline Lake Dam No. 1 cannot pass one-half the PMF, the various percentage non-breach PMF flows were routed 0.5 miles downstream through two successive reaches to the Borough of Wanaque-Midvale. A second set of flood routings using the same PMF's were routed through both reservoirs and downstream using the assumption that both dams would breach. These routings were made in order to assess the degree of increased flood hazard caused by breaching due to an inadequate spillway. For the downstream channel routings estimates of channel shapes, slopes and roughnesses were made based on conditions observed in the field and on U.S.G.S. topographic maps. The locations of the cross-sections used in the channel routings are shown on page D-7, Appendix D.

Estimates of stage-spillway and overtop discharge curves, reservoir stage-storage curves, and dam breach parameters were used to route the various floods through the two reservoirs. Assumptions and data used in these estimates are described, for each dam, in the following paragraphs.

Skyline Lake No. 2

The spillway and overtop discharge rating curve used in the flood routing through Skyline Lake No. 2 was calculated using the weir equation and assuming free overflow across the whole length of the dam and spillway. The spillway is a broad-crested weir and has an estimated discharge coefficient of 2.6. The dam crest is a broad-crested weir with heavy overgrowth, and has an estimated discharge coefficient of 2.6. The reservoir stage-storage curve was determined from U. S. Geological Survey 7.5 - minute topographic maps and contour maps of proposed excavation of the lake that were obtained from the owner. At the time of the field inspection a significant portion of the proposed excavation was complete and, therefore, in this analysis the ultimate proposed lake topography was assumed. This stage-storage curve was extended above the dam crest to include surcharge storage during peak discharges. In the reservoir routing computations possible discharges through the outlet works were excluded because their capacity is small compared to the PMF and because of the possibility that the outlet valve may be closed. The stage-storage and the spillway and overtop stage-discharge curves for Skyline Lake Dam No. 2 are presented in Appendix D as Plates D-3 and D-4, respectively.

The breach parameters used in the HEC-1 analysis for Skyline Lake No. 2 are: the breach is rectangular in shape, 180 feet long, will extend to the original reservoir floor elevation (260 ft), will begin breaching when the dam is first overtopped, and will develop to its maximum size in 3.0 hours. The peak outflow from Skyline Lake No. 2 for the 15 percent, 25 percent, 50 percent, and 100 percent PMF, assuming failure, were calculated to be approximately 2,620 cfs, 4,020 cfs, 6,580 cfs, and 10,750 cfs, respectively.

Skyline Lake Dam No. 1

The spillway and overtop stage-discharge rating curve used in the flood routings through Skyline Lake No. 1 was calculated using the weir equation and assuming free overflow across the whole length of the dam and spillway. The spillway has an ogee cross-section and from data in the State files has a calculated discharge coefficient of 3.5. The dam crest is a broad crested weir with heavy overgrowth and has an estimated discharge coefficient of 2.6. The reservoir stage-storage curve was estimated from U. S. Geological Survey 7.5 - minute topographic maps. This stage-storage curve was extended above the dam crest to include surcharge storage during peak flood discharges. In the reservoir routing computations possible discharges through the outlet works were excluded because their capacity is small compared to the PMF and because of the possibility that the outlet valves may be closed. The stage-storage and the spillway and overtop stage-discharge curves for Skyline Lake Dam No. 1 are presented in Appendix D as Plates D-6 and D-7, respectively.

The breach parameters used in the HEC-1 analysis for Skyline Lake No. 1 are: the breach is rectangular in shape, 160 feet long, will extend to the approximate original reservoir floor elevation (259.3'), will begin breaching when the dam is first overtopped, and will develop to its maximum size in 1 hour. The peak outflow from Skyline Lake No. 1 for the 15 percent, 25 percent 50 percent and 100 percent PMF assuming failure, were calculated to be approximately 4,570 cfs, 5,910 cfs, 6,550 cfs, and 10,610 cfs, respectively.

The above described analyses resulted in the flooding characteristics at the Borough of Wanaque-Midvale that are summarized in the following tabulation.

No Breaching	15% PMF	25% PMF	50% PMF	100% PMF
Peak Discharge, cfs	1,305	2,450	5,080	10,240
Peak Flow Depth, ft.	5.8	7.1	9.1	11.5
Peak Flow Width, ft.	135	185	265	400
Peak Flow Velocity, fps	4.4	4.9	5.3	5.9
Breaching				
Peak Discharge, cfs	4,490	5,840	6,410	10,560
Peak Flow Depth, ft.	8.7	9.5	9.8	11.6
Peak Flow Width, ft.	250	280	290	405
Peak Flow Velocity, fps	5.2	5.5	5.6	5.9

The reservoir drain intake for Skyline Lake No. 1 is at the floor of the lake near the dam and is 20 inches in diameter. Using the orifice flow equation, and assuming no tailwater and no inflows into the lake, the time required to drain the reservoir from a spillway full condition was calculated to be a little over 40 hours.

b. Experience Data

Records of lake levels are not maintained for this site. The reservoir is operated to maintain maximum water levels for aesthetic and recreational purposes.

c. Visual Observations

The perimeter of the reservoir has generally moderately steep slopes with local, gently sloping areas. The adjacent area is heavily wooded and populated with single

family residences.

A stilling basin is located immediately downstream of Skyline Lake Dam No. 1 and a bridge and playground are located approximately 300 and 500 feet downstream, respectively. The banks of the flood plain are moderately steep immediately downstream from the dam. The flood plain becomes wider and the banks less steep farther downstream from the dam.

d. Overtopping Potential

As indicated in Section 5.1-a, the spillway can pass only 15 percent of the PMF assuming the upstream No. 2 dam does not fail. However, the upstream dam could fail due to overtopping and cause overtopping and failure of the No. 1 dam. This would result in a significantly larger flood downstream during the more frequent floods, such as the 15 and 25 percent PMF, and a significantly higher hazard to several residences in the Borough of Wanaque-Midvale that are near the stream banks and at elevations below the maximum flood stage. Thus, in accordance with the Corps' guidelines, the spillway for Skyline Lake Dam No. 1 is classified as seriously inadequate.

SECTION 6: STRUCTURAL STABILITY

6.1 Evaluation of Structural Stability

a. Visual Observations

At the time of the inspection the dam did not exhibit any significant signs of distress. Some cracking and spalling at the spillway weir and concrete wing walls and minor erosion of the embankments were observed. These factors are not presently severe enough to significantly affect the structural strength or stability of the dam, but could jeopardize the integrity of the structure if left unchecked.

The outlet works appear to be in satisfactory condition based on visual observations.

b. Design and Construction Data

The available design and construction data are inadequate to evaluate the structural stability, since little is known of design criteria, construction methods or as-built material properties.

c. Operating Records

There is no instrumentation of the dam. The reservoir is essentially uncontrolled except for occasional draining of the reservoir for repairs to the dam and reservoir. Records of reservoir levels and water withdrawals are not available.

d. Post-Construction Changes

Earthfill was placed on both banks of the downstream

channel between the dam and bridge shortly after construction to prevent seepage which had been observed along the toe of the western embankment. However, the seepage then reappeared at the edge of the fill along the channel. In 1946 the State recommended that a clay blanket should be placed upstream of the dam to eliminate the leakage; however, no further correspondence regarding this subject is available and it is not known whether the blanket was installed.

e. Seismic Stability

The dam is located in Seismic Zone 1, in which it may generally be assumed that there is no hazard from earthquakes, provided static stability conditions are satisfactory and conventional safety margins exist. However, as pointed out in Section 2.1-a, the dam is close to the seismically active Ramapo fault, and the valley in which the dam is located may be structurally controlled. Data are insufficient at this time to assess seismic stability should a significant earthquake occur in the vicinity of the dam.

SECTION 7: ASSESSMENT, RECOMMENDATIONS, PROPOSED REMEDIAL MEASURES

7.1 Dam Assessment

a. Safety

The safety of Skyline Lake Dam No. 1 is in question because the present spillway can pass only about 15% of the Probable Maximum Flood and is classified as seriously inadequate.

The structural stability of Skyline Lake Dam No. 1 cannot be quantitatively analyzed due to lack of available data. The visual inspection indicates that the dam is in fair condition. There is evidence of erosion of the embankment adjacent to the spillway wing walls exposing the steel sheet pile core wall. In addition, there is cracking and spalling of the concrete spillway and wing-walls.

b. Adequacy of Information

The information and data obtained are not adequate to perform a comprehensive, definitive evaluation of the dam's structural stability because of lack of data regarding as-built conditions and physical properties of the dam and foundation materials.

c. Urgency

The deficiencies revealed by the visual inspection do not appear to be critical; however, they could imperil the integrity of the structure if left unchecked. Therefore, it is recommended that the owners perform the

remedial measures discussed below, the most urgent of which should be done as soon as possible.

d. Necessity for Additional Data/Evaluation

At the present time there is insufficient information available to fully evaluate the structural stability of the dam. The Corps of Engineers Guidelines require that, in general, seepage and stability analyses should be on record for all dams in the high hazard category. There is presently no information about the as-built properties of the embankment. In addition, seepage at the toe of the dam has been previously noted by others. Therefore, a program of borings and laboratory tests should be performed to confirm the properties of the as-built embankment materials. Piezometers should also be installed to establish internal water levels in the downstream slope. These data should be evaluated by an experienced geotechnical engineer. The piezometers should be permanent and read periodically. The field investigation should begin in the near future and the evaluation performed soon after completion of the field work and testing. In addition, the dam should be surveyed in the near future to confirm the as-built geometry of the dam.

The hydrologic analysis indicates that the spillway is seriously inadequate. Therefore, more sophisticated and detailed hydrologic and hydraulic analyses should be made soon. From this, a positive action program of corrective measures should be developed and implemented as necessary.

Although the dam is located in Seismic Zone 1, it is situated in a valley which was possibly formed as the result of faulting and is in close proximity to the seismically active Ramapo Fault. Therefore, the potential seismicity at the dam site and its effect on the stability of the dam should be investigated.

7.2 Remedial Measures

a. Recommendations

It is recommended that the following remedial measures be preformed as soon as possible:

1. The hole at the right downstream toe of the spillway should be filled to avoid further erosion.
2. The cracks and spalling in the spillway and concrete wing walls should be repaired.

b. Operation and Maintenance Procedures

A program of inspections of the dam during and after critical floods and annually should be initiated by the owners, utilizing the standard visual checklist in this report. Timely corrective action should be taken as necessary.

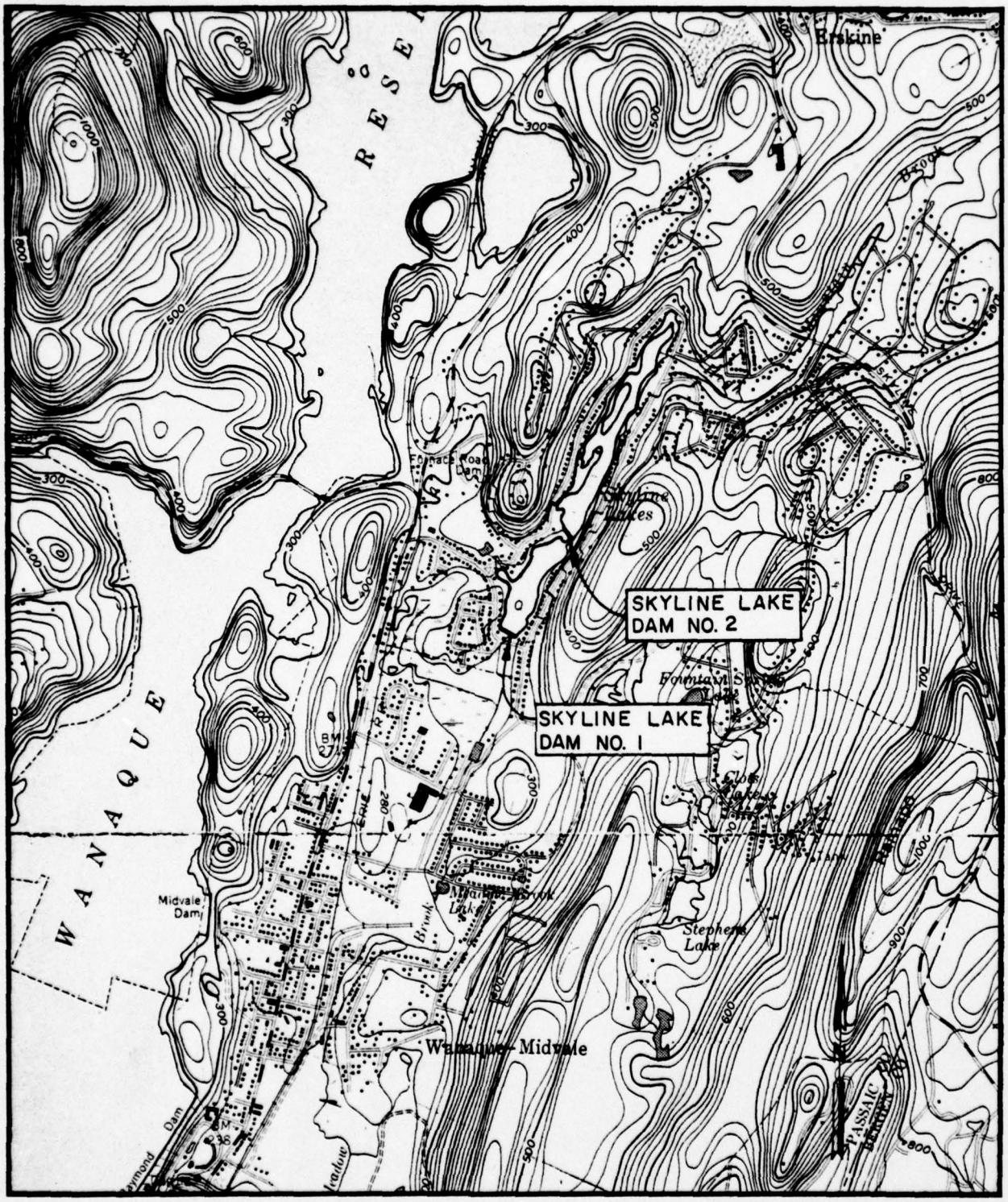
A permanent record should be kept of all maintenance and operating events of the dam and reservoir.

All brush and small trees should be removed from the embankment soon in order to facilitate inspection of the embankment, permit embankment restoration, and prevent root damage and possible piping problems. Clearing of the downstream face should continue as standard maintenance procedure.

A warning system coordinated with a warning system for Skyline Lake Dam No. 2 should be established whereby downstream inhabitants can be notified and evacuated in the event of possible dam failure.

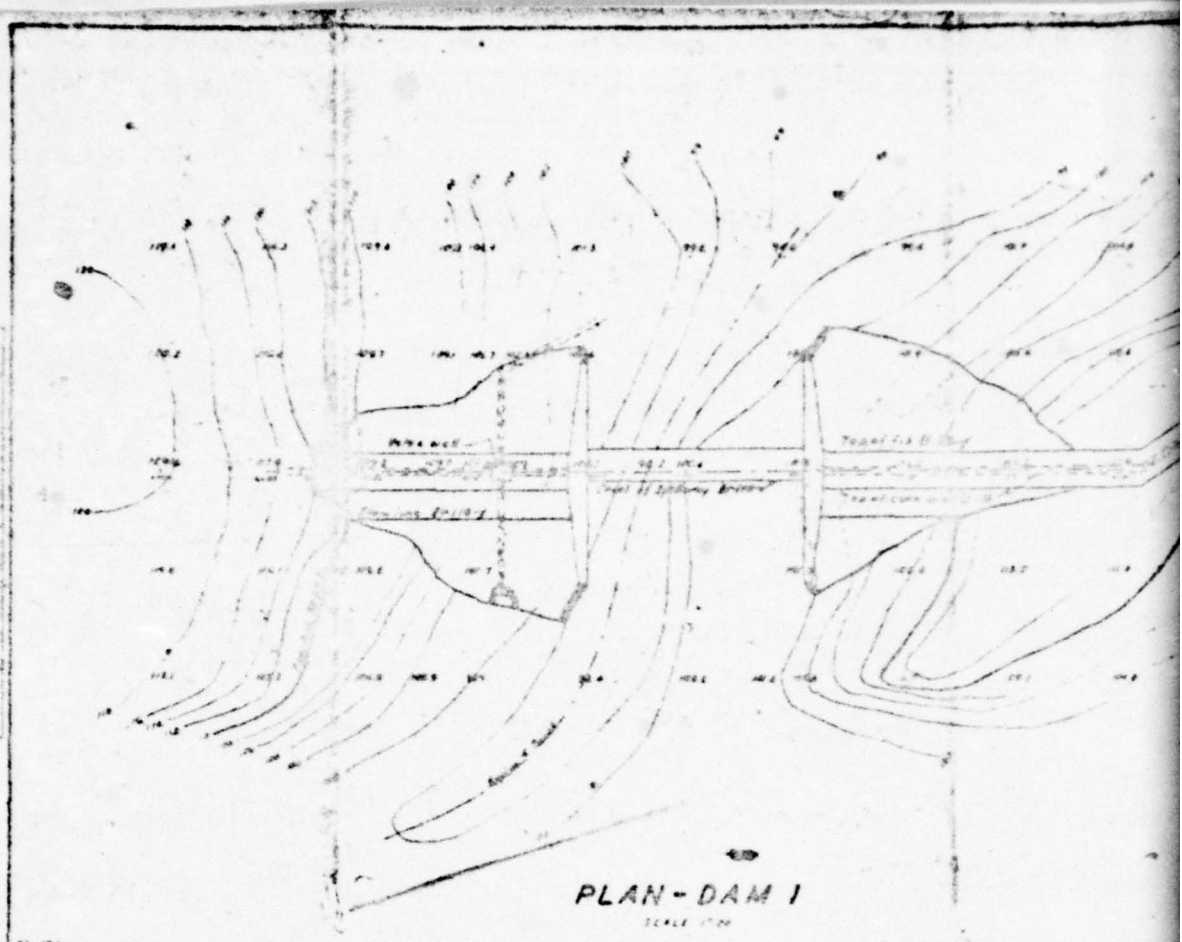
PLATES

PLATE 1

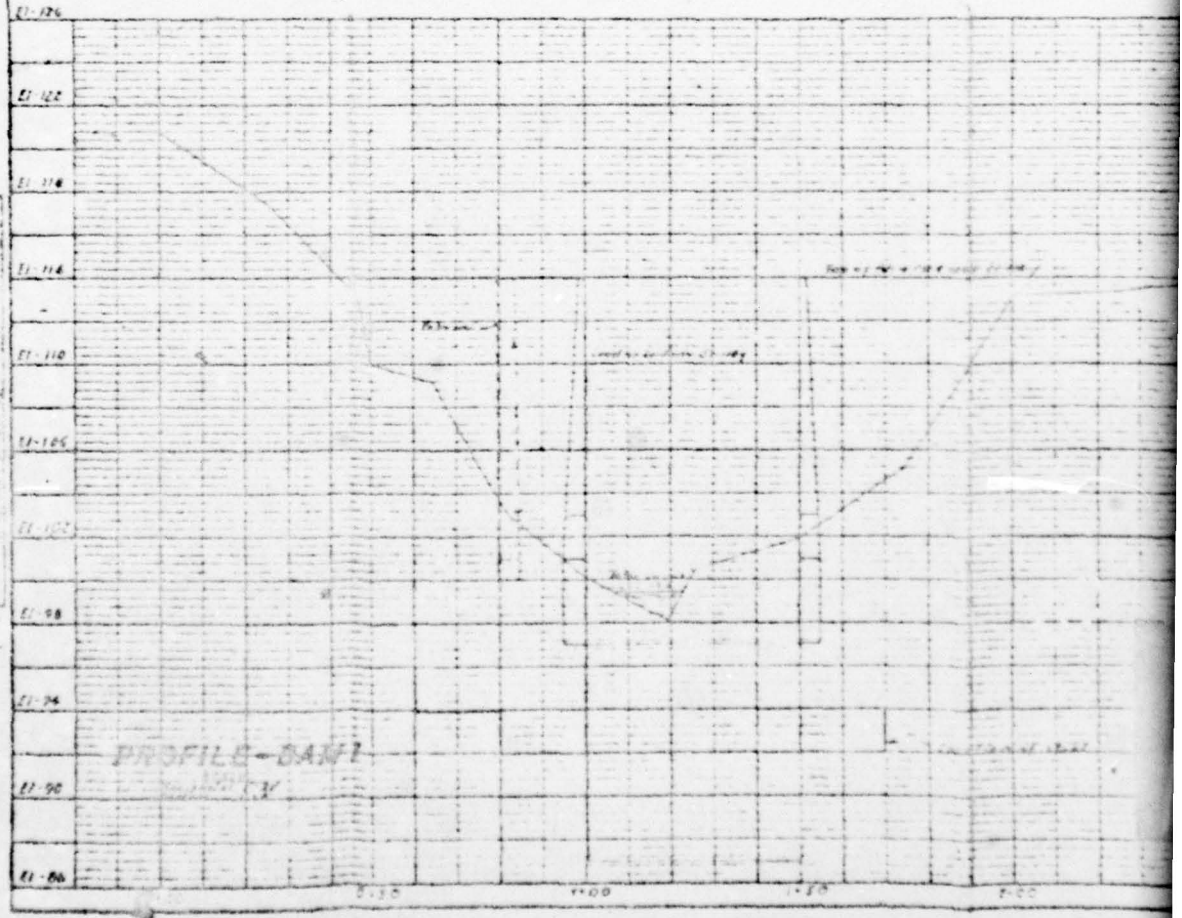


VICINITY MAP

JENNY-LEEDSHILL JANUARY 1979

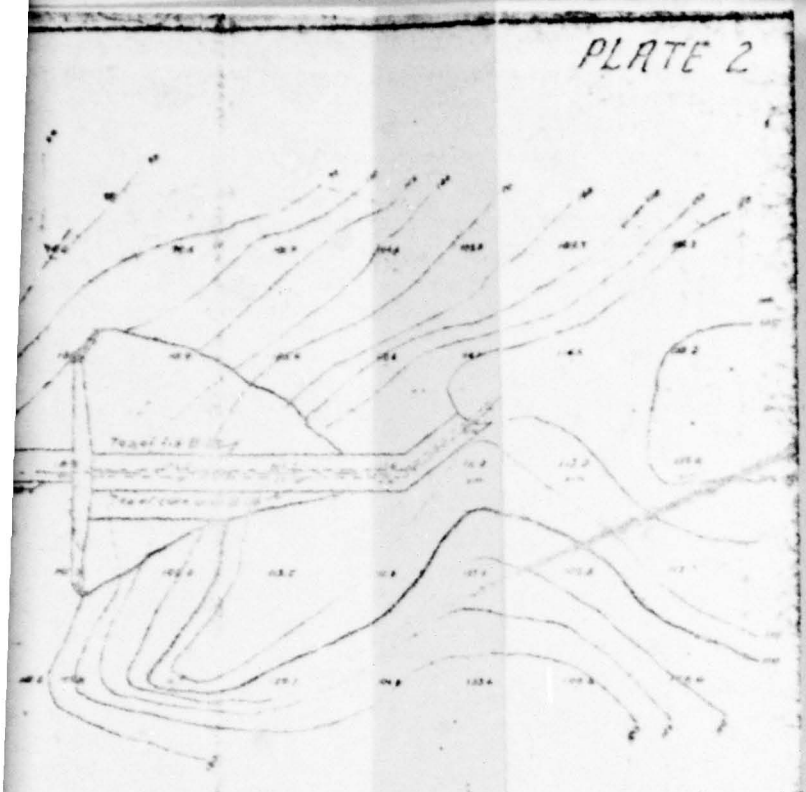


PLAN - DAM 1

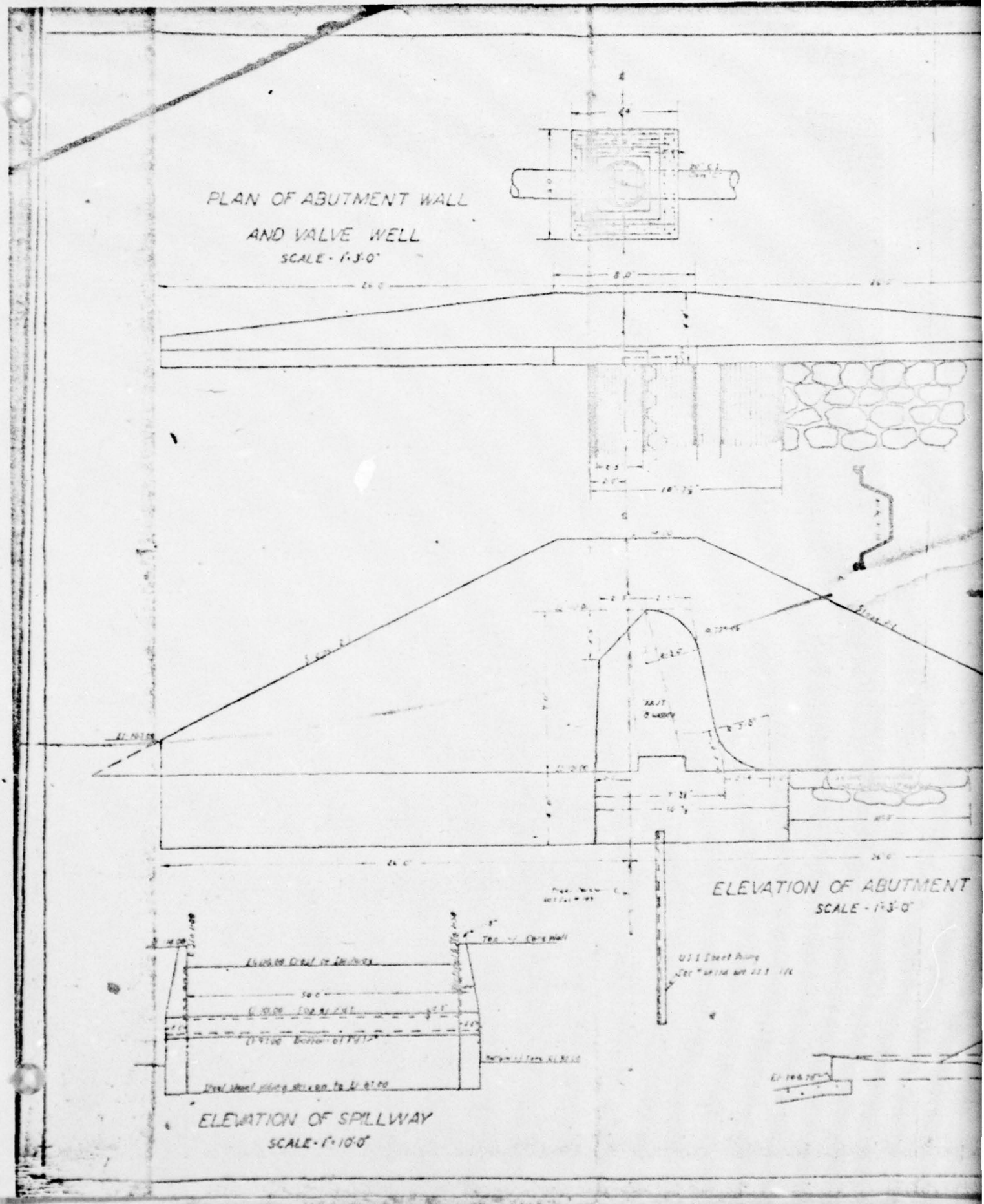


PROFILE - DAM 1

PLATE 2

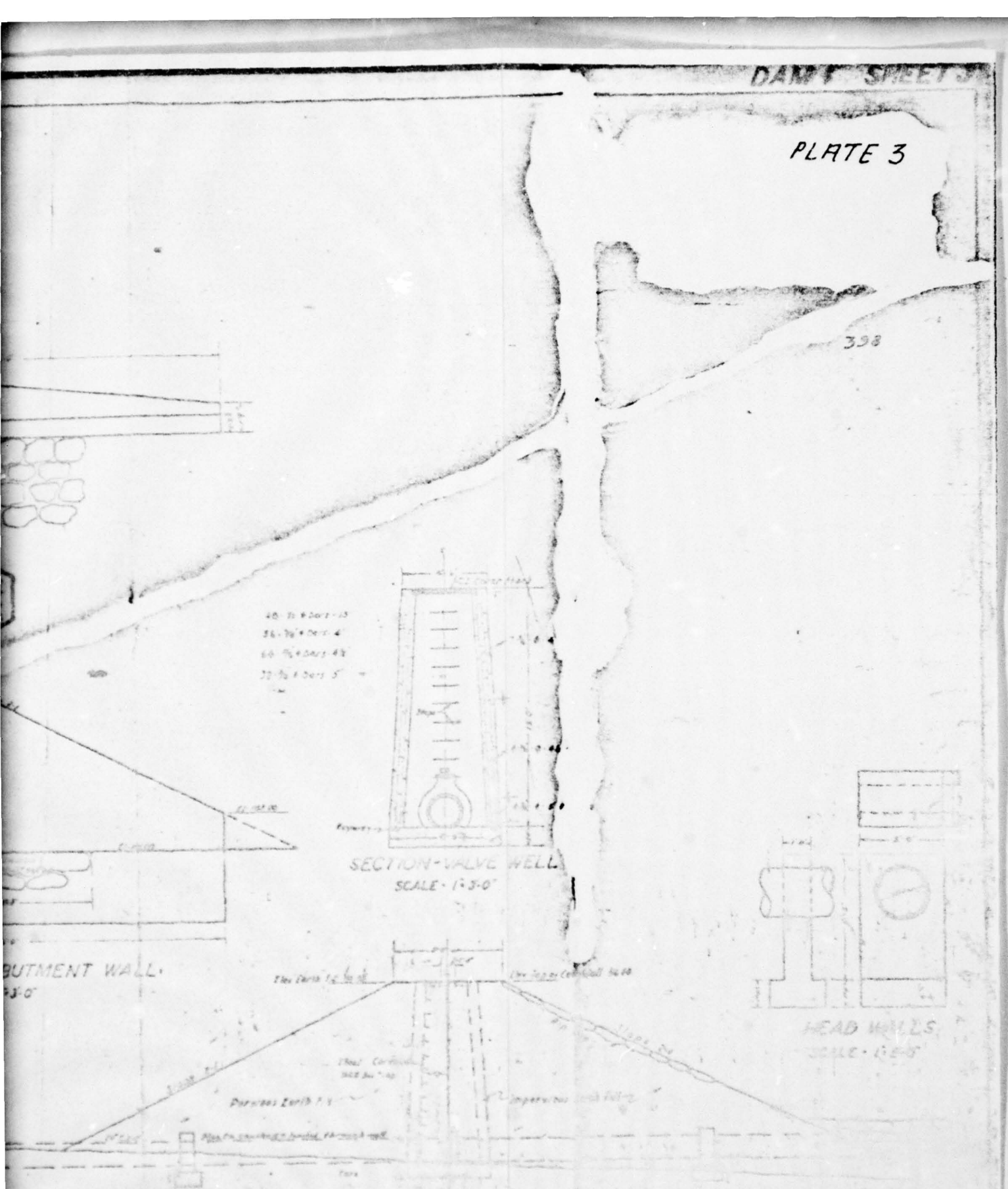


M 1


PLAN OF ABUTMENT WALL
AND VALVE WELL
SCALE - 1"-3'-0"
ELEVATION OF ABUTMENT
SCALE - 1"-3'-0"
ELEVATION OF SPILLWAY
SCALE - 1"-10'-0"

DAM 1 SHEET 3

PLATE 3



APPENDIX A

CHECK LIST - VISUAL OBSERVATIONS

CHECK LIST - ENGINEERING, CONSTRUCTION MAINTENANCE DATA

Check List
Visual Inspection
Phase 1

Name Dam Skyline Lake Dam No. 1 County Passaic State New Jersey Coordinators NJDEP

Coordinates: Lat. 41° 03' 56" N
Long. 74° 16' 39" W

Date(s) Inspection Dec. 1 & 20, 1978 Weather Clear Temperature 40°F

Pool Elevation at Time of Inspection 261.3 ft M.S.L. Tailwater at Time of Inspection 259.3 ft M.S.L.

Inspection Personnel:

(Dec. 1, 1978)

P. L. Wagner

R. C. Gaffin

A. R. Slaughter

(Dec. 20, 1978)

R. J. Jenny

D. J. Lachel

F. L. Panuzio

A. R. Slaughter

R. C. Gaffin Recorder

Owners Representation - (Dec. 1, 1978)

Mrs. K. Rausch, Skyline Lake Property Owners. Assoc.

CONCRETE/MASONRY DAMS

Skyline Lake Dam No. 1

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
SEEPAGE OR LEAKAGE	Not Applicable	
STRUCTURE TO ABUTMENT/EMBANKMENT JUNCTIONS	Not Applicable	
DRAINS	Not Applicable	
WATER PASSAGES	Not Applicable	
FOUNDATION	Not Applicable	

CONCRETE/MASONRY DAMS

Skyline Lake Dam No. 1

VISUAL EXAMINATION OF	OBERSVATIONS	REMARKS OR RECOMMENDATIONS
SURFACE CRACKS CONCRETE SURFACES	Not Applicable	
STRUCTURAL CRACKING	Not Applicable	
VERTICAL AND HORIZONTAL ALIGNMENT	Not Applicable	
MONOLITH JOINTS	Not Applicable	
CONSTRUCTION JOINTS	Not Applicable	

EMBANKMENT

Skyline Lake Dam No. 1

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
SURFACE CRACKS	None	
UNUSUAL MOVEMENT OR CRACKING AT OR BEYOND THE TOE	None	
SLOUGHING OR EROSION OF EMBANKMENT AND ABUTMENT SLOPES	Erosion was noted behind wing walls on both sides of spillway, exposing sheet piling.	
VERTICAL AND HORIZONTAL ALINEMENT OF THE CREST	Some erosion of crest near spillway wing walls forming sag in vertical alignment.	
RIPRAP FAILURES	No riprap observed.	

EMBANKMENT

Skyline Lake Dam No. 1

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
VEGETATION	Few trees up to 1' diameter and brush	
JUNCTION OF EMBANKMENT AND ABUTMENT, SPILLWAY AND DAM	Erosion behind each wing wall exposing sheet piling.	
ANY NOTICEABLE SEEPAGE	None	
STAFF GAGE AND RECORDER	None	
DRAINS	None	

OUTLET WORKS

Skyline Lake Dam No. 1

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CRACKING AND SPALLING OF CONCRETE SURFACES IN OUTLET CONDUIT	None observed.	
INTAKE STRUCTURE	Intake submerged; locked manhole on valve chamber located just downstream of centerline of dam on left embankment.	
OUTLET STRUCTURE	No cracks observed; partly submerged. Flowing 100-150 gpm during first inspection.	
OUTLET CHANNEL	Discharges adjacent to spillway into natural stream channel.	
EMERGENCY GATE	Same as outlet	

UNGATED SPILLWAY

Skyline Lake Dam No. 1

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CONCRETE WEIR	Ogee spillway has 5 equally spaced construction joints with discernable cracks in all except right joint. Center crack has been widened by erosion up to 1" width at crest and was filled with asphalt at one time. Seepage through 4 cracks on left indicated by leaching deposits.	
APPROACH CHANNEL	Some debris and considerable sediment build up at spillway	
DISCHARGE CHANNEL	Rebar ends exposed slightly in right wing wall. Hole 10" X 14" X 12" in apron at base of ogee on right side. Trees and some debris in stilling basin immediately d/s of spillway.	Hole should be repaired.
BRIDGE AND PIERS	Both wing walls have vertical cracks above center of Ogee to top of walls.	

GATED SPILLWAY
(None)

Skyline Lake Dam No. 1

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CONCRETE SILL	Not Applicable	
APPROACH CHANNEL	Not Applicable	
DISCHARGE CHANNEL	Not Applicable	
BRIDGE AND PIERS	Not Applicable	
GATES AND OPERATION EQUIPMENT	Not Applicable.	

INSTRUMENTATION

Skyline Lake Dam No. 1

VISUAL EXAMINATION	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
MONUMENTATION/SURVEYS	None	
OBSERVATION WELLS	None	
WEIRS	None	
PIEZOMETERS	None	
OTHER	None	

RESERVOIR

Skyline Lake Dam No. 1

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
SLOPES	Moderately steep to gentle slopes; houses around entire perimeter; moderately wooded	
SEDIMENTATION	5 ft. sediment build up at center of upstream side of spillway Ogee and 8 ft. high on sides of spillway crest.	

DOWNSTREAM CHANNEL

Skyline Lake Dam No. 1

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CONDITION (OBSTRUCTIONS, DEBRIS, ETC.)	Road bridge with opening 19.2' wide by 6.2' high about 300' d/s. Numerous trees immediately downstream of dam. Water tank and playground are located immediately downstream of bridge.	
SLOPES	Gently sloping right bank immediately downstream with retaining wall (max. height 5') approximately 35 feet west of spillway. Left bank is gently sloping approximately 5H:1V. Downstream of bridge right bank of channel is steep (1H:1V) but left bank is low,	
APPROXIMATE NO. OF HOMES AND POPULATION	with playing field adjacent. About 12 houses to left of playing field on left bank downstream of bridge at elevations at or above spillway crest. Approximately 6 houses in the Borough of Wanaque-Midvale are within the downstream flood path.	

CHECK LIST
ENGINEERING DATA
DESIGN, CONSTRUCTION, OPERATION

Skyline Lake Dam No.1

ITEM	REMARKS
PLAN OF DAM	Two sheets showing plan and profile of dam dated July 10, 1945, prepared by Newell Harrison, P.E., submitted with Report on Dam Application No. 398.
REGIONAL VICINITY MAP	Dam and reservoir are shown on USGS, Wanaque Quadrangle (Scale 1:24,000)
CONSTRUCTION HISTORY	Eight Monthly Progress Reports on the construction of the dam prepared by the design engineer are available.
TYPICAL SECTIONS OF DAM	See 'Plan of Dam'.
HYDROLOGIC/HYDRAULIC DATA	Drainage area, spillway capacity and estimated maximum flood flow based on 125% Central Jersey Curve, are given in the Report on Dam Application No. 398.
OUTLETS - PLAN	
- DETAILS	See 'Plan of Dam'
-CONSTRAINTS	None
-DISCHARGE RATINGS	None
RAINFALL/RESERVOIR RECORDS	None Available

CHECK LIST
ENGINEERING DATA
DESIGN, CONSTRUCTION, OPERATION

Skyline Lake Dam No. 1

ITEM	REMARKS
DESIGN REPORTS	None Available
GEOLOGY REPORTS	None Available
DESIGN COMPUTATIONS HYDROLOGY & HYDRAULICS DAM STABILITY SEEPAGE STUDIES	None Available
MATERIALS INVESTIGATIONS BORING RECORDS LABORATORY FIELD	Application for permit for construction or Repair of Dam #398 dated June 27, 1945 indicates that the foundation material is "sand, gravel, clay and hardpan, as determined by test holes". However, no boring records, laboratory or field data are available.
POST-CONSTRUCTION SURVEYS OF DAM	Contour map of reservoir prepared by William Wirring, dated Jan. 31, 1978.
BORROW SOURCES	Unknown

CHECK LIST
ENGINEERING DATA
DESIGN, CONSTRUCTION, OPERATION

Skyline Lake Dam No. 1

ITEM	REMARKS
SPILLWAY-PLAN -SECTIONS -DETAILS	See 'Plan of Dam'
OPERATING EQUIPMENT PLANS & DETAILS	See 'Plan of Dam' for plans and details of outlet works
MONITORING SYSTEMS	None
MODIFICATIONS	None
HIGH POOL RECORDS	None
POST CONSTRUCTION ENGINEERING STUDIES AND REPORTS	None
PRIOR ACCIDENTS OR FAILURE OF DAM DESCRIPTION REPORTS	None

CHECK LIST
ENGINEERING DATA
DESIGN, CONSTRUCTION, OPERATION

Skyline Lake Dam No. 1

ITEM	REMARKS
MAINTENANCE OPERATION RECORDS	None

APPENDIX B

PHOTOGRAPHS

(Note: All photographs were taken on Dec. 1, 1978)

Photo 1 View along dam crest looking west

Photo 2 View of left (east) spillway abutment looking upstream

Photo 3 View of left abutment looking upstream

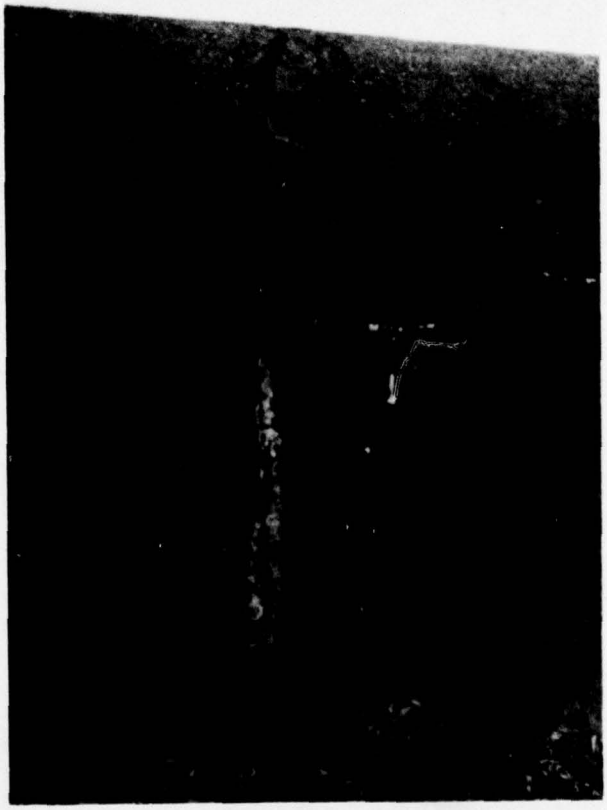


Photo 4 View of construction joint in center of downstream face of spillway

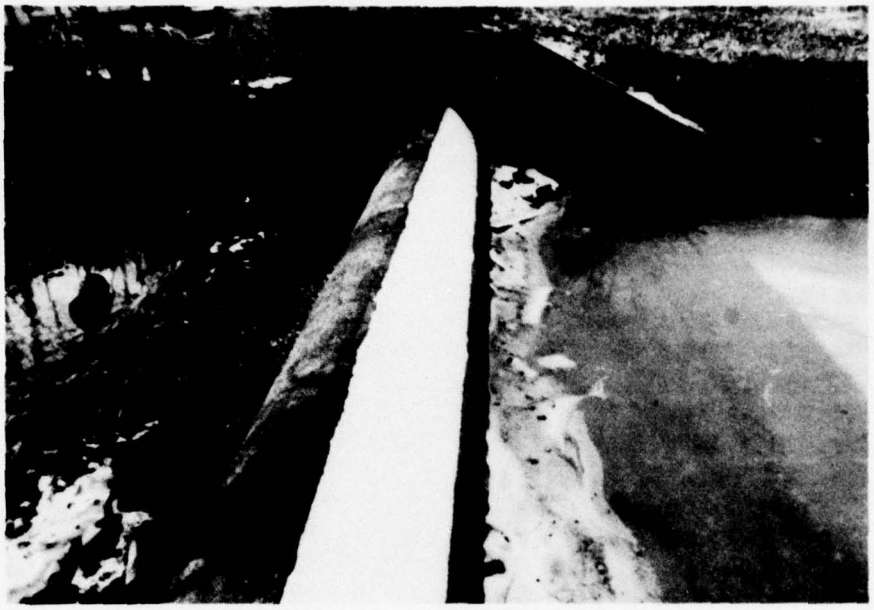


Photo 5 View of spillway crest looking west

Photo 6 View of eroded pocket between spillway toe and apron, adjacent to right wing wall

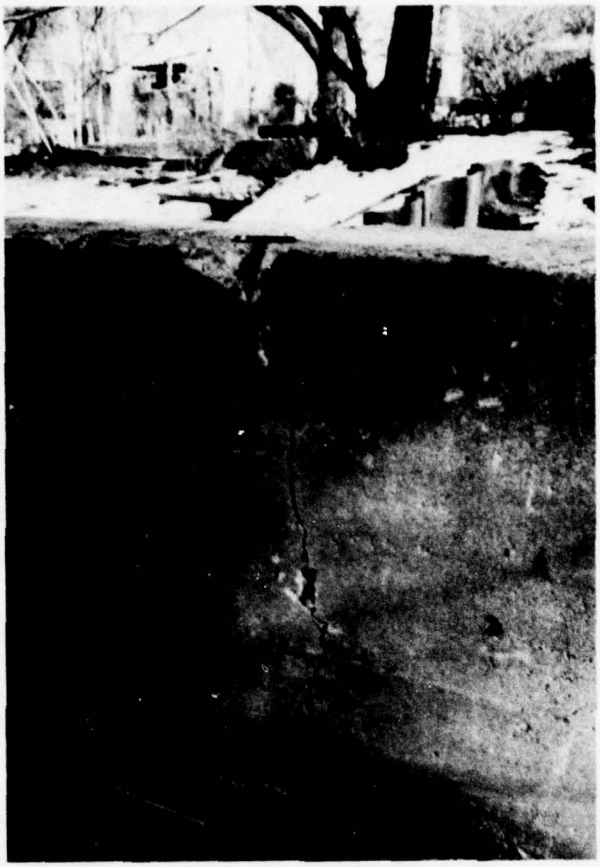


Photo 7 View showing crack in left (east) wing wall

Photo 8 View of reservoir looking upstream from dam

Photo 9 View looking downstream from dam

Photo 10 View looking downstream from bridge shown in Photo 9

APPENDIX C

REGIONAL GEOLOGY - HIGHLANDS

REGIONAL GEOLOGY - HIGHLANDS PROVINCE

Physiography

The New Jersey Highlands extend northeast-southwest across the state from the New York border to the Delaware River. Included in the province are the northwest portions of Hunterdon, Passaic and Morris Counties and the southeastern portions of Warren and Sussex Counties. This province lies between the Appalachian Ridge and Valley Province to the northwest and the Piedmont Lowlands Province to the southeast (See Figure C-1) and is part of the larger New England Physiographic Province.

The Highlands are characterized by rounded and flat-topped northeast-southwest ridges and mountains up to 1,400 feet high separated by narrow valleys. The orientation of the valleys is usually, but not always, controlled by the underlying geologic structure.

Bedrock

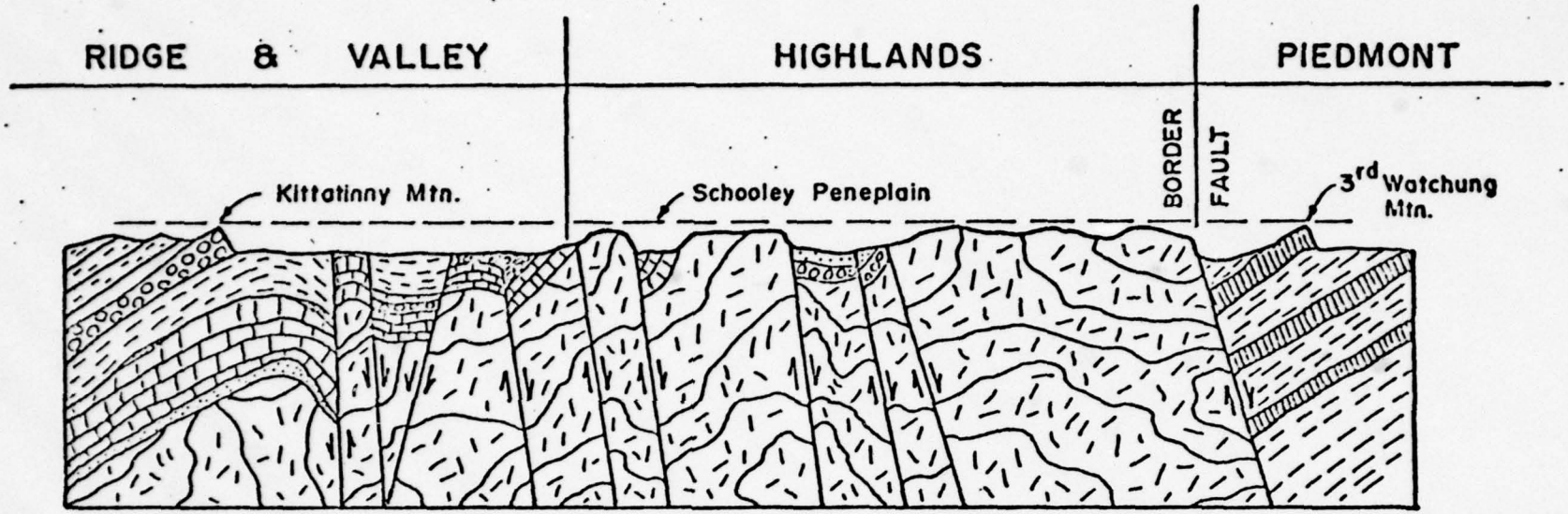
Bedrock of the region is predominently Precambrian gneisses, schists and metasediments. Some sedimentary rocks, typically sandstones, shales and conglomerate have been infolded and infaulted into the valley bottoms.

The regional geologic structure reflects the very old age of bedrock. A number of regional faults cross the area in a northeast-southwest direction. The Ramapo Fault scarp, forming the eastern border of the province, is more than 30 miles long. Faults also control many of the river valley orientations.

Mountain crests slope uniformly from northwest to southwest, a direct result of the fact that the entire area was once part of the now dissected Schooley peneplain.

Overburden

Much of the province was covered by the Pleistocene age Wisconsin glacier. The glacier stripped most of the existing overburden and weathered rock and uncovered the numerous hard bedrock knobs and ridges seen throughout the province. Most of the side-slopes in the area are covered with heavy boulder tills (ground moraine), while glacial outwash and recent alluvium cover the valleys. South of the terminal moraine extending from Morristown to Belvidere, scattered remnants of earlier stages of glaciation (Illinoian and Kansan) have deposited ground moraine (glacial tills) over the bedrock. In the valleys and over some of the ground moraine, recent and glacio-fluvial alluviums have been deposited.



SCHEMATIC CROSS-SECTION OF NEW JERSEY HIGHLANDS PHYSIOGRAPHIC PROVINCE (AFTER WOLFE, 1977)

JENNY/LEEDSHILL
JANUARY 1979

FIGURE C-1

APPENDIX D

HYDROLOGIC AND HYDRAULIC COMPUTATIONS

SKYLINE LAKE No. 2

CHECK LIST
HYDROLOGIC AND HYDRAULIC DATA
ENGINEERING DATA

DRAINAGE AREA CHARACTERISTICS: 2.8 SQUARE MILES

ELEVATION TOP NORMAL POOL (STORAGE CAPACITY): 280.3 FT (330 AF)

ELEVATION TOP FLOOD CONTROL POOL (STORAGE CAPACITY): 284.3 (400 AF)

ELEVATION MAXIMUM DESIGN POOL: —

ELEVATION TOP DAM: 284.3 FT

CREST: SPILLWAY

a. Elevation 280.3
b. Type CONCRETE WALL
c. Width 1'±
d. Length 50 FT
e. Location Spillover LEFT ABUTMENT (LOOKING DOWNSTREAM
f. Number and Type of Gates NONE

OUTLET WORKS:

a. Type 20" PIPE & GATE VALVE
b. Location RIGHT SIDE OF SPILLWAY (LOOKING DOWNSTREAM)
c. Entrance inverts 261.8
d. Exit inverts —
e. Emergency draindown facilities

HYDROMETEOROLOGICAL GAGES: NONE

a. Type
b. Location
c. Records

MAXIMUM NON-DAMAGING DISCHARGE: 1040 CFS

. SKYLINE LAKE No. 1

CHECK LIST
HYDROLOGIC AND HYDRAULIC DATA
ENGINEERING DATA

DRAINAGE AREA CHARACTERISTICS: 2.9 SQ MILES

ELEVATION TOP NORMAL POOL (STORAGE CAPACITY): 268.2 FT (85 AF)

ELEVATION TOP FLOOD CONTROL POOL (STORAGE CAPACITY): 272.2 FT (150 AF)

ELEVATION MAXIMUM DESIGN POOL:

ELEVATION TOP DAM: 272.2 FT

CREST: SPILLWAY

a. Elevation 268.2 FT
b. Type CONCRETE OGEE
c. Width —
d. Length 50 FT
e. Location Spillover CENTER OF DAM
f. Number and Type of Gates NONE

OUTLET WORKS:

a. Type 20" PIPE & GATE VALVE
b. Location LEFT ABUTMENT (LOOKING DOWNSTREAM)
c. Entrance inverts 257.3
d. Exit inverts —
e. Emergency draindown facilities

HYDROMETEOROLOGICAL GAGES: NONE

a. Type
b. Location
c. Records

MAXIMUM NON-DAMAGING DISCHARGE: 1400 CFS

SKYLINE LAKE No. 1 & 2

CHAMPION LINE NO. 836-P LEEDS, HILL AND JEWETT, INC.

BY RBE DATE 781220 CLIENT N.J. SHEET NO. 1 OF 2

CHKD. DATE JOB TIME OF CONCENTRATION JOB NO. 302

DATA

L = STREAM LENGTH FROM WATERSHED OUTLET TO THE MOST DISTANT RIDGE = 4.05 mi

L_{CA} = STREAM LENGTH FROM BASIN CENTROID = 2.125 mi

H = DIFF BETWEEN ELEV AT OUTLET AND ELEV AT MOST DISTANT POINT = 830 - 245 = 585'

T_C = TIME OF CONCENTRATION OR TIME FOR WATER TO FLOW FROM THE MOST DISTANT POINT IN THE WATERSHED TO THE WATERSHED OUTLET

T_L = LAG TIME FROM CENTER OF EXCESS RAINFALL TO TIME OF PEAK. $= 0.6\,T_C$

METHOD 1

$$T_C = \frac{L^{1.15}}{7700\,H^{0.38}}$$

L IN FT
H IN FT

$$T_L = \frac{0.6\,L^{1.15}}{7700\,H^{0.38}}$$

METHOD 2

$$T_C = \left(\frac{11.9\,L^3}{H}\right)^{0.385}$$

L IN MILES
H IN FT

$$T_L = 0.6\left(\frac{11.9\,L^3}{H}\right)^{0.385}$$

METHOD 3

$$T_L = C_T\left(\frac{L\,L_C}{S^{1/2}}\right)^{0.38}$$

S IN FT/MI $S = H/L = 2.7$

$$T_L = C_T\left(\frac{L\,L_C}{(H/L)^{1/2}}\right)^{0.38}$$

C_T = 1.2 MOUNTAIN
= 0.72 FOOTHILL
= 0.35 VALLEY DRAINAGE AREA

METHOD 4

$T_C = L/V$

$T_L = 0.6\,L/V$

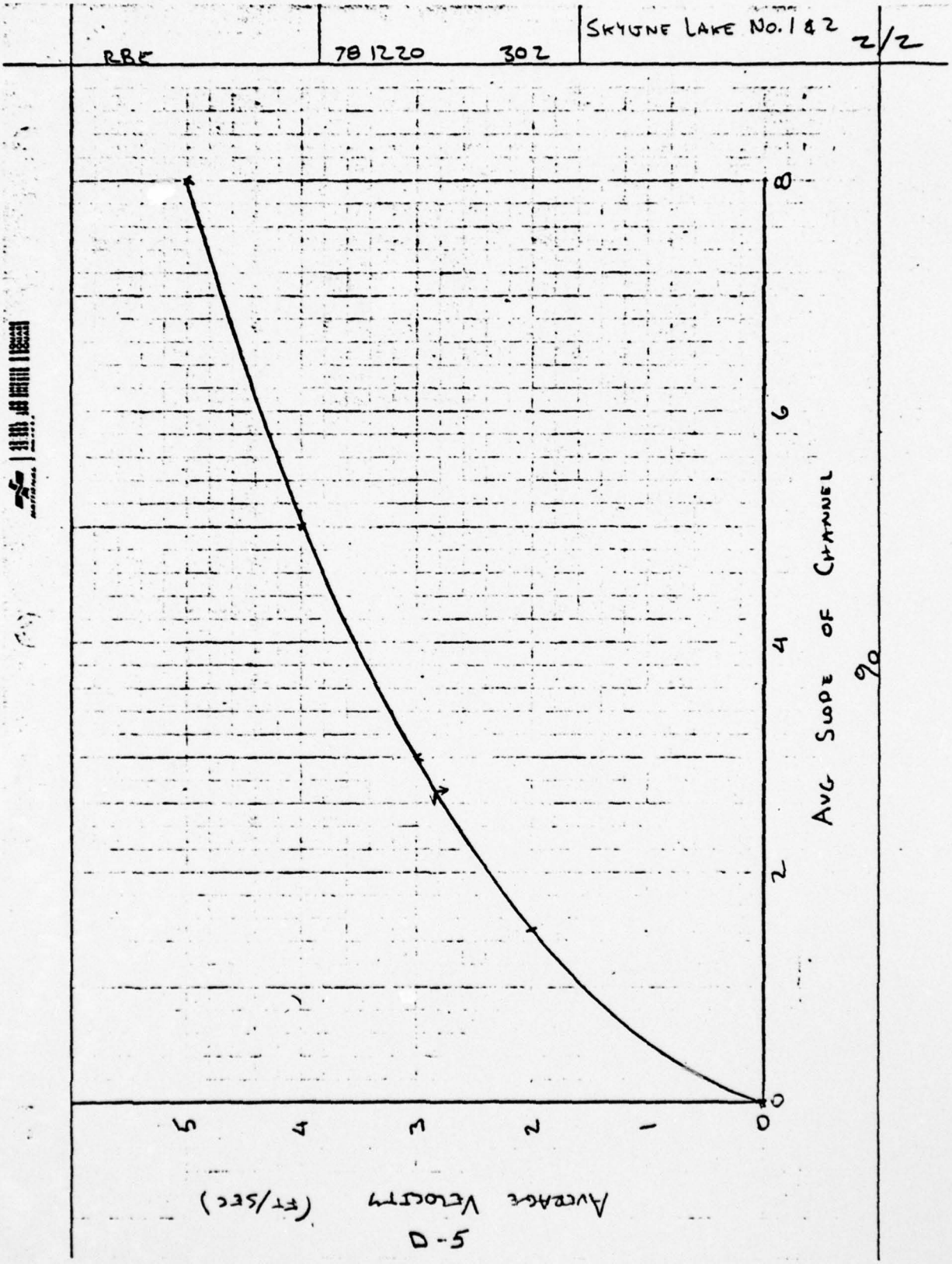
V = AVG VELOCITY FROM CURVE OF V VS. AVG SLOPE

V = 2.8 fps

DAM SKYLINE # 2

METHODS 1	2	3	4	USE
LAG IN HOURS				
0.7	0.7	1.1	1.3	1.0

RBE | 781220 | 302 | SKYGNE LAKE No. 1 & 2 | 2/2



D-5

LEEDS, HILL AND JEWETT, INC.

BY RBE DATE CLIENT N.J. DAM SAFETY SHEET NO. OF

CHKD DATE JOB JOB NO. 302-03

REFERENCES

METHOD 1 - FROM "HANDBOOK OF APPLIED HYDROLOGY" BY CHOW McGRAW HILL pp 21-10, 11

METHOD 2 - FROM CALIFORNIA CULVERTS PRACTICE, CALIF HIGHWAYS AND PUBLIC WORKS, SEPT 1942 SEE USBR DESIGN OF SMALL DAMS PG. 71

METHOD 3 - FROM HYDROLOGY FOR ENGINEERS LINSLEY / KOHLER / PAULUS 1975 pp 247-248

METHOD 4 - FROM U.S. NAVY - TECHNICAL PUBLICATION NAVDOCKS TP-PW-5 TABLE 8B, MARCH 1953 SEE USBR DESIGN OF SMALL DAMS PG. 70

RBE 790207 | SKYLINE LAKE No. 1 & 2 | 302-03

LOCATION MAP OF CROSS-SECTIONS USED IN ROUTING CALCULATIONS

LEEDS, HILL AND JEWETT, INC.

BY RBF DATE 7/9/12 CLIENT New Jersey SHEET NO. 07

CHKD. DATE JOB SKYLINE #1 & #2 JOB NO. 202-01

SKYLINE LAKE No. 1 AND No. 2

Channel Cross-Sections [1]

Station	Distance Downstream of Dam (ft)	Mannings n° Left Over-Bank	Mannings n° Main Channel	Mannings n° Right Over-Bank	Channel Invert (ft)	Max Elev. (ft)	Reach Length (ft)	Energy Grade Line Slope	X or Y	X or Y (ft) 1	2	3	4	5	6	7	8
Skyline No. 1																	
4 - Below Dam	150	0.10	.045	0.10	257	290	150	0.006	X	0	150	490	500	525	535	700	1150
									Y	290	280	261	257	257	261	280	290
5	2400	.045	.045	.045	250	280	2250	0.004	X	0	1000	1181	1150	1175	1175	1300	1600
									Y	280	260	253	250	250	253	260	280

[1] Looking Downstream

[2] See Vents Chow Sheet

TABLE 5-6. VALUES OF THE ROUGHNESS COEFFICIENT n (*continued*)

Type of channel and description	Minimum	Normal	Maximum
C. EXCAVATED OR DREDGED			
a. Earth, straight and uniform			
1. Clean, recently completed	0.016	0.018	0.020
2. Clean, after weathering	0.018	0.022	0.025
3. Gravel, uniform section, clean	0.022	0.025	0.030
4. With short grass, few weeds	0.022	0.027	0.033
b. Earth, winding and sluggish			
1. No vegetation	0.023	0.025	0.030
2. Grass, some weeds	0.025	0.030	0.033
3. Dense weeds or aquatic plants in deep channels	0.030	0.035	0.040
4. Earth bottom and rubble sides	0.028	0.030	0.035
5. Stony bottom and weedy banks	0.025	0.035	0.040
6. Cobble bottom and clean sides	0.030	0.040	0.050
c. Dragline-excavated or dredged			
1. No vegetation	0.025	0.028	0.033
2. Light brush on banks	0.035	0.050	0.060
d. Rock cuts			
1. Smooth and uniform	0.025	0.035	0.040
2. Jagged and irregular	0.035	0.040	0.050
e. Channels not maintained, weeds and brush uncut			
1. Dense weeds, high as flow depth	0.050	0.080	0.120
2. Clean bottom, brush on sides	0.040	0.050	0.080
3. Same, highest stage of flow	0.045	0.070	0.110
4. Dense brush, high stage	0.080	0.100	0.140
D. NATURAL STREAMS			
D-1. Minor streams (top width at flood stage <100 ft)			
a. Streams on plain			
1. Clean, straight, full stage, no rifts or deep pools	0.025	0.030	0.033
2. Same as above, but more stones and weeds	0.030	0.035	0.040
3. Clean, winding, some pools and shoals	0.033	0.040	0.045
4. Same as above, but some weeds and stones	0.035	0.045	0.050
5. Same as above, lower stages, more ineffective slopes and sections	0.040	0.048	0.055
6. Same as 4, but more stones	0.045	0.050	0.060
7. Sluggish reaches, weedy, deep pools	0.050	0.070	0.080
8. Very weedy reaches, deep pools, or floodways with heavy stand of timber and underbrush	0.075	0.100	0.150

MAIN CHANNEL
STATIONS 455

TABLE 5-6. VALUES OF THE ROUGHNESS COEFFICIENT n (*continued*)

Type of channel and description	Minimum	Normal	Maximum
b. Mountain streams, no vegetation in channel, banks usually steep, trees and brush along banks submerged at high stages			
1. Bottom: gravels, cobbles, and few boulders	0.030	0.040	0.050
2. Bottom: cobbles with large boulders	0.040	0.050	0.070
D-2. Flood plains			
a. Pasture, no brush			
1. Short grass	0.025	0.030	0.035
2. High grass	0.030	0.035	0.050
b. Cultivated areas			
1. No crop	0.020	0.030	0.040
2. Mature row crops	0.025	0.035	0.045
3. Mature field crops	0.030	0.040	0.050
c. Brush			
1. Scattered brush, heavy weeds	0.035	0.050	0.070
2. Light brush and trees, in winter	0.035	0.050	0.060
3. Light brush and trees, in summer	0.040	0.060	0.080
4. Medium to dense brush, in winter	0.045	0.070	0.110
5. Medium to dense brush, in summer	0.070	0.100	0.160
d. Trees			
1. Dense willows, summer, straight	0.110	0.150	0.200
2. Cleared land with tree stumps, no sprouts	0.030	0.040	0.050
3. Same as above, but with heavy growth of sprouts	0.050	0.060	0.080
4. Heavy stand of timber, a few down trees, little undergrowth, flood stage below branches	0.080	0.100	0.120
5. Same as above, but with flood stage reaching branches	0.100	0.120	0.160
D-3. Major streams (top width at flood stage >100 ft). The n value is less than that for minor streams of similar description, because banks offer less effective resistance.			
a. Regular section with no boulders or brush	0.025	.....	0.060
b. Irregular and rough section	0.035	.....	0.100

D-9

OPEN-CHANNEL HYDRAULICS

VEN TE CHOW, Ph.D.

Professor of Hydraulic Engineering
University of Illinois

Thm 790219	Skyline Lake #2	302.03

Breach Parameters [1]

Breach width = 180 ft.
Breach Shape = Rectangular
Time to maximum Breach size = 3 hours.
Begin Breach when first overtopped
Breach to elevation 262.8

Thm 790219	Skyline Lake #1	

Breach Parameters [1]

Breach width = 160 ft
Breach shape = Rectangular
Time to Maximum Breach size = 1 hour
Begin Breach when first overtopped
Breach to Elevation 259.3

[1] Based on previous studies of actual dam failures

DRAWDOWN CALCULATION [1]

ELEV. (FT)	STO. (AF)	Δ STO (AF)	MEAN HEAD (FT)	Δ TIME HR	Σ TIME HR
280.3	330				
		90	15.9	26.0	
275	240				26
		65	10.7	22.9	
270	175				48.9
		60	5.7	29.0	
265	115				77.9
		30	1.6	27.3	
261.8	85				105.2

20" PIPE & GATE VALVE

USE ORIFICE EQUATION

$$Q = CA\sqrt{2g}\sqrt{H}$$

ASSUME $C = 0.6$

$$Q = 0.6\left[\frac{\pi}{4}\left(\frac{20}{12}\right)^2\right]\sqrt{2g}\sqrt{H}$$

$$Q = 10.5\ H^{1/2}$$

$$\Delta \text{STORAGE} / \Delta \text{TIME} = 10.5\ H^{1/2}\ (1/43560\ \text{FT}^3/\text{AF})(3600\ \text{SEC/HR})$$

$$\Delta \text{TIME} = \Delta \text{STORAGE} / 0.868\ H^{1/2}$$

Σ TIME TO DRAIN = 105.2 hrs / 24 hr/DAY = 4.4 DAYS

[1] ASSUMES 1) NO INFLOWS TO LAKE
2) NO TAILWATER EFFECTS

DRAWDOWN CALCULATION[1]

ELEV. (FT)	STO. (AF)	Δ STO (AF)	MEAN HEAD (FT)	Δ TIME (HR)	Σ TIME HRS
268.2	85				
		40	9.3	15.1	
265	45				15.1
		40	5.2	20.2	
260	5				35.3
		5	1.35	5.0	
257.3	0				40.3

20" PIPE AND GATE VALVE

USE ORIFICE EQUATION

$$Q = CA\sqrt{2gH}$$

ASSUME $C = 0.6$

$$Q = 0.6\left(\frac{\pi}{4}\left(\frac{20}{12}\right)^2\right)\sqrt{2gH}$$

$$\frac{\Delta \text{STORAGE}}{\Delta \text{TIME}} = 10.5\ H^{1/2}\ (1/43560\ \text{FT}^3/\text{AF})\ (3600\ \text{SEC/HR})$$

$$\Delta \text{TIME} = \Delta \text{STORAGE} / 0.868\ H^{1/2}$$

Σ TIME TO DRAIN = 40.3 HR / 24 hr/DAY = 1.7 DAYS

[1] ASSUMES, 1) NO INFLOWS TO LAKE
2) NO TAILWATER EFFECTS

No Breach

```
***********************************
FLOOD HYDROGRAPH PACKAGE (HEC-1)
DAM SAFETY VERSION      JULY 1978
  LAST MODIFICATION  25 SEP 78
***********************************
        A1     NEW JERSEY DAM SAFETY - SKYLINE NO. 1 + 2, I.D. NO. 00203 + 00200
        A2     HYDRAULIC-HYDROLOGIC ANALYSIS   302-03
        A3     PROBABLE MAXIMUM FLOOD                                   -RBE-
        B     144       0      10       0       0       0       0       0       0       0
        B1      5
        J       1       4       1
        J1   0.15    0.75     0.5     1.0
        K       0       1                                       1
        K1     RUNOFF FROM AREA ABOVE SKYLINE LAKE NO. 2
        M       1       2     2.8             2.8
        P            22.0     112     123     133
        T                                                     1.0    0.10
        W2            1.0
        X      -1    -.05     2.0
        K       1       2                                       1
        K1                     ROUTED FLOWS THROUGH SKYLINE 2
        Y                               1       1
        Y1      2                                             330
        $S      0      10      70     170     330     425     525     670
        $E  249.9     250     260     270   280.3     285     290     295
        $$  290.3      50     2.6     1.5
        $D  294.3     2.6     1.5     180
        K       1       3                                       1
        K1                 ROUTED FLOWS THROUGH SKYLINE 1
        Y                               1       1
        Y1      1                                              85
        $S      0       5      45      85     110     195     290
        $E  257.3     260     265   268.2     270     275     280
        $$  269.2      50     3.5     1.5
        $D  272.2     2.6     1.5     160
        K       1       4                                       1
        K1         CHANNEL ROUTING -MODIFIED PULS- STATION 3 TO 4
        Y                               1       1
        Y1      1
        Y5    0.1   0.045     0.1     257     290     150    .006
        Y7      0     290     150     250     490     261     500     257     925     297
        Y7    935     261     700     280    1150     290
        K       1       5                                       1
        K1         CHANNEL ROUTING -MODIFIED PULS- STATION 4 TO 5
        Y                               1       1
        Y1      1
        Y6  0.045   0.045   0.045     250     280    2290   0.004
        Y7      0     280    1000     260    1150     253    1150     250    1175     250
        Y7   1175     253    1300     260    1600     280
        K      99
```

PREVIEW OF SEQUENCE OF STREAM NETWORK CALCULATIONS

```
RUNOFF HYDROGRAPH AT          1
ROUTE HYDROGRAPH TO           2
ROUTE HYDROGRAPH TO           3
ROUTE HYDROGRAPH TO           4
ROUTE HYDROGRAPH TO           5
END OF NETWORK
```

```
**********************************
FLOOD HYDROGRAPH PACKAGE (HEC-1)
DAM SAFETY VERSION      JULY 1978
  LAST MODIFICATION  25 SEP 78
**********************************

RUN  DATE= 01/24/79
     TIME= 15.37.21.
```

NEW JERSEY DAM SAFETY - SKYLINE NO. 1 & 2, I.D. NO. 00203 & 00200
HYDRAULIC-HYDROLOGIC ANALYSIS 302-03
PROBABLE MAXIMUM FLOOD -RBE-

JOB SPECIFICATION

NO	NHR	NMIN	IDAY	IHR	IMIN	METRC	IPLT	IPRT	NSTAN
144	0	10	6	0	0	0	0	0	0
			JOPER	NWT	LROPT	TRACE			
			5	0	0	0			

MULTI-PLAN ANALYSES TO BE PERFORMED
NPLAN= 1 NRTIO= 4 LRTIO= 1

RTIOS= .15 .25 .50 1.00

********** ********** ********** ********** **********

SUB-AREA RUNOFF COMPUTATION

RUNOFF FROM AREA ABOVE SKYLINE LAKE NO. 2

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
1	0	0	0	0	0	1	0	0

HYDROGRAPH DATA

IHYDG	IUHG	TAREA	SNAP	IRSDA	IRSPC	RATIO	ISNOW	ISAME	LOCAL
1	2	2.80	0.00	2.80	0.00	0.000	0	0	0

PRECIP DATA

SPFE	PMS	R6	R12	R24	R48	R72	R96
0.00	22.00	112.00	123.00	133.00	0.00	0.00	0.00

TRSPC COMPUTED BY THE PROGRAM IS .800

LOSS DATA

LROPT	STRKR	DLTKR	RTIOL	ERAIN	STRKS	RTIOK	STRTL	CNSTL	ALSMX	RTIMP
0	0.00	0.00	1.00	0.00	0.00	1.00	1.00	.10	0.00	0.00

UNIT HYDROGRAPH DATA
TC= 0.00 LAG= 1.00

RECESSION DATA
STRTQ= -1.00 QRCSN= -.05 RTIOR= 2.00

UNIT HYDROGRAPH 32 END OF PERIOD ORDINATES. TC= 0.00 HOURS, LAG= 1.00 VOL= 1.00

84.	249.	510.	655.	1119.	1239.	1239.	1134.	989.	791.
584.	452.	349.	279.	218.	168.	131.	102.	79.	61.
48.	37.	29.	23.	18.	14.	11.	9.	7.	5.
3.	1.								

END-OF-PERIOD FLOW

MO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP Q	MO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP Q
1.01	.10	1	.02	0.00	.02	3.	1.01	12.10	73	.33	.31	.02	429.
1.01	.20	2	.02	0.00	.02	2.	1.01	12.20	74	.33	.31	.02	496.
1.01	.30	3	.02	0.00	.02	2.	1.01	12.30	75	.33	.31	.02	634.
1.01	.40	4	.02	0.00	.02	2.	1.01	12.40	76	.33	.31	.02	899.
1.01	.50	5	.02	0.00	.02	2.	1.01	12.50	77	.33	.31	.02	1176.
1.01	1.00	6	.02	0.00	.02	2.	1.01	13.00	78	.33	.31	.02	1516.
1.01	1.10	7	.02	0.00	.02	2.	1.01	13.10	79	.33	.30	.02	1902.
1.01	1.20	8	.02	0.00	.02	2.	1.01	13.20	80	.39	.36	.02	2290.
1.01	1.30	9	.02	0.00	.02	2.	1.01	13.30	81	.39	.38	.02	2695.
1.01	1.40	10	.02	0.00	.02	1.	1.01	13.40	82	.39	.38	.02	2769.
1.01	1.50	11	.02	0.00	.02	1.	1.01	13.50	83	.39	.38	.02	3003.
1.01	2.00	12	.02	0.00	.02	1.	1.01	14.00	84	.39	.38	.02	3209.
1.01	2.10	13	.02	0.00	.02	1.	1.01	14.10	85	.49	.48	.02	3394.
1.01	2.20	14	.02	0.00	.02	1.	1.01	14.20	86	.49	.48	.02	3570.
1.01	2.30	15	.02	0.00	.02	1.	1.01	14.30	87	.49	.48	.02	3745.
1.01	2.40	16	.02	0.00	.02	1.	1.01	14.40	88	.49	.48	.02	3927.
1.01	2.50	17	.02	0.00	.02	1.	1.01	14.50	89	.49	.48	.02	4112.
1.01	3.00	18	.02	0.00	.02	1.	1.01	15.00	90	.49	.48	.02	4292.
1.01	3.10	19	.02	0.00	.02	1.	1.01	15.10	91	.45	.43	.02	4455.
1.01	3.20	20	.02	0.00	.02	1.	1.01	15.20	92	.75	.73	.02	4616.
1.01	3.30	21	.02	0.00	.02	1.	1.01	15.30	93	1.35	1.33	.02	4844.
1.01	3.40	22	.02	0.00	.02	1.	1.01	15.40	94	3.37	3.35	.02	5379.
1.01	3.50	23	.02	0.00	.02	1.	1.01	15.50	95	.97	.96	.02	6267.
1.01	4.00	24	.02	0.00	.02	1.	1.01	16.00	96	.60	.58	.02	7521.
1.01	4.10	25	.02	0.00	.02	0.	1.01	16.10	97	.46	.44	.02	8955.
1.01	4.20	26	.02	0.00	.02	0.	1.01	16.20	98	.46	.44	.02	10042.
1.01	4.30	27	.02	0.00	.02	0.	1.01	16.30	99	.46	.44	.02	10542.
1.01	4.40	28	.02	0.00	.02	0.	1.01	16.40	100	.46	.44	.02	10563.
1.01	4.50	29	.02	0.00	.02	0.	1.01	16.50	101	.46	.44	.02	10029.
1.01	5.00	30	.02	0.00	.02	0.	1.01	17.00	102	.46	.44	.02	9317.
1.01	5.10	31	.02	0.00	.02	0.	1.01	17.10	103	.36	.34	.02	8421.
1.01	5.20	32	.02	0.00	.02	0.	1.01	17.20	104	.36	.34	.02	7523.
1.01	5.30	33	.02	0.00	.02	0.	1.01	17.30	105	.36	.34	.02	6843.
1.01	5.40	34	.02	0.00	.02	0.	1.01	17.40	106	.36	.34	.02	6293.
1.01	5.50	35	.02	0.00	.02	0.	1.01	17.50	107	.36	.34	.02	5829.
1.01	6.00	36	.02	0.00	.02	0.	1.01	18.00	108	.36	.34	.02	5421.
1.01	6.10	37	.05	0.00	.05	0.	1.01	18.10	109	.03	.01	.02	5062.
1.01	6.20	38	.05	0.00	.05	0.	1.01	18.20	110	.03	.01	.02	4672.
1.01	6.30	39	.05	0.00	.05	0.	1.01	18.30	111	.03	.01	.02	4273.
1.01	6.40	40	.05	0.00	.05	0.	1.01	18.40	112	.03	.01	.02	3902.
1.01	6.50	41	.05	0.00	.05	0.	1.01	18.50	113	.03	.01	.02	3592.
1.01	7.00	42	.05	.02	.04	2.	1.01	19.00	114	.03	.01	.02	3331.
1.01	7.10	43	.05	.04	.02	9.	1.01	19.10	115	.03	.01	.02	2274.
1.01	7.20	44	.05	.04	.02	22.	1.01	19.20	116	.03	.01	.02	1435.
1.01	7.30	45	.05	.04	.02	47.	1.01	19.30	117	.03	.01	.02	1453.
1.01	7.40	46	.05	.04	.02	84.	1.01	19.40	118	.03	.01	.02	1152.
1.01	7.50	47	.05	.04	.02	127.	1.01	19.50	119	.03	.01	.02	925.
1.01	8.00	48	.05	.04	.02	173.	1.01	20.00	120	.03	.01	.02	753.
1.01	8.10	49	.05	.04	.02	217.	1.01	20.10	121	.03	.01	.02	619.
1.01	8.20	50	.05	.04	.02	257.	1.01	20.20	122	.03	.01	.02	521.
1.01	8.30	51	.05	.04	.02	290.	1.01	20.30	123	.03	.01	.02	486.
1.01	8.40	52	.05	.04	.02	315.	1.01	20.40	124	.03	.01	.02	454.
1.01	8.50	53	.05	.04	.02	335.	1.01	20.50	125	.03	.01	.02	423.
1.01	9.00	54	.05	.04	.02	350.	1.01	21.00	126	.03	.01	.02	395.
1.01	9.10	55	.05	.04	.02	361.	1.01	21.10	127	.03	.01	.02	369.
1.01	9.20	56	.05	.04	.02	370.	1.01	21.20	128	.03	.01	.02	344.
1.01	9.30	57	.05	.04	.02	378.	1.01	21.30	129	.03	.01	.02	321.
1.01	9.40	58	.05	.04	.02	383.	1.01	21.40	130	.03	.01	.02	299.
1.01	9.50	59	.05	.04	.02	387.	1.01	21.50	131	.03	.01	.02	279.
1.01	10.00	60	.05	.04	.02	391.	1.01	22.00	132	.03	.01	.02	261.
1.01	10.10	61	.05	.04	.02	393.	1.01	22.10	133	.03	.01	.02	243.
1.01	10.20	62	.05	.04	.02	395.	1.01	22.20	134	.03	.01	.02	227.
1.01	10.30	63	.05	.04	.02	397.	1.01	22.30	135	.03	.01	.02	212.
1.01	10.40	64	.05	.04	.02	398.	1.01	22.40	136	.03	.01	.02	197.
1.01	10.50	65	.05	.04	.02	399.	1.01	22.50	137	.03	.01	.02	184.
1.01	11.00	66	.05	.04	.02	400.	1.01	23.00	138	.03	.01	.02	172.
1.01	11.10	67	.05	.04	.02	401.	1.01	23.10	139	.03	.01	.02	160.
1.01	11.20	68	.05	.04	.02	401.	1.01	23.20	140	.03	.01	.02	150.
1.01	11.30	69	.05	.04	.02	401.	1.01	23.30	141	.03	.01	.02	140.
1.01	11.40	70	.05	.04	.02	402.	1.01	23.40	142	.03	.01	.02	131.
1.01	11.50	71	.05	.04	.02	402.	1.01	23.50	143	.03	.01	.02	123.
1.01	12.00	72	.05	.04	.02	402.	1.02	0.00	144	.03	.01	.02	117.
									SUM	23.41	20.70	2.71	224497.
										(595.)(	526.)(	69.)(	6360.37)

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	10542.	5429.	1561.	1561.	224836.
CMS	299.	154.	44.	44.	6366.
INCHES		18.04	20.75	20.75	20.75
MM		458.12	527.01	527.01	527.01
AC-FT		2692.	3097.	3097.	3097.
THOUS CU M		3321.	3820.	3820.	3820.

HYDROGRAPH AT STA 1 FOR PLAN 1, RTIO 4

3.	2.	2.	2.	2.	2.	2.	2.	2.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	2.	9.	22.	47.	44.	127.	173.	237.	257.
290.	315.	335.	350.	361.	370.	378.	383.	387.	391.
393.	395.	397.	398.	399.	400.	401.	401.	401.	402.
402.	402.	425.	494.	634.	669.	1176.	1516.	1982.	2150.
2445.	2740.	3073.	3258.	3354.	3573.	3745.	3927.	4112.	4292.
4455.	4616.	4844.	5379.	6267.	7521.	8955.	10142.	10542.	10503.
10029.	9317.	8421.	7523.	6443.	5283.	5429.	5421.	5042.	4672.
4276.	3807.	3291.	2771.	2276.	1934.	1453.	1150.	923.	753.
518.	521.	486.	454.	423.	395.	367.	344.	321.	299.
279.	261.	243.	227.	212.	197.	184.	172.	163.	150.
140.	137.	137.	137.						

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	10542.	5429.	1561.	1561.	224836.
CMS	249.	154.	44.	44.	6366.
INCHES		18.04	20.75	20.75	20.75
MM		458.12	527.01	527.01	527.01
AC-FT		2692.	3097.	3097.	3097.
THOUS CU M		3321.	3820.	3820.	3820.

AD-A069 950 NEW JERSEY STATE DEPT OF ENVIRONMENTAL PROTECTION TRENTON F/G 13/2
NATIONAL DAM SAFETY PROGRAM. SKYLINE LAKE DAM NUMBER 1 (NJ00203--ETC(U)
MAY 79 R J JENNY DACW61-78-C-0124

UNCLASSIFIED NL

2 OF 2
AD
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DATE
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D-17

HYDROGRAPH ROUTING

ROUTED FLOWS THROUGH SKYLINE 2

ISTAO	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
2	1	0	0	0	0	1	0	0

ROUTING DATA

QLOSS	CLOSS	AVG	IRES	ISAME	IOPT	IPMP	LSTR
0.0	0.000	0.00	1	1	0	0	0

NSTPS	NSTOL	LAG	AMSKK	X	TSK	STORA	ISPRAT
1	0	0	0.040	0.000	0.000	330.	0

CAPACITY=	0.	10.	70.	170.	330.	415.	525.	670.
ELEVATION=	249.	250.	260.	270.	285.	285.	290.	295.

CREL	SPVOL	COOW	EXPW	ELEVL	COOL	CAREA	EXPL
290.3	50.0	2.6	1.5	0.0	0.0	0.0	0.0

DAM DATA

TOPEL	COOD	EXPD	DAMWID
304.3	2.6	1.5	100.

STATION 2, PLAN 1, RATIO 4

END-OF-PERIOD HYDROGRAPH ORDINATES

OUTFLOW

0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	1.	2.	5.	10.	20.	34.	54.
79.	107.	136.	166.	195.	222.	247.	276.	293.	300.
323.	330.	347.	357.	363.	371.	377.	382.	385.	390.
391.	393.	397.	409.	446.	504.	619.	783.	1067.	1434.
1902.	2290.	2618.	2919.	3155.	3361.	3551.	3737.	3924.	4110.
4288.	4458.	4646.	4973.	5583.	6556.	7854.	9171.	10093.	10427.
10314.	9749.	9032.	8167.	7397.	6756.	6227.	5761.	5301.	5006.
4631.	4722.	3770.	3292.	2816.	2369.	1969.	1629.	1321.	1106.
901.	878.	787.	713.	650.	596.	550.	509.	472.	439.
410.	382.	358.	335.	314.	294.	276.	259.	243.	229.
215.	203.	192.	184.						

STORAGE

330.	330.	330.	330.	330.	330.	330.	330.	330.	330.
330.	330.	330.	330.	330.	330.	330.	330.	332.	330.
330.	330.	333.	330.	330.	330.	330.	330.	333.	330.
330.	330.	330.	330.	330.	330.	330.	330.	330.	330.
330.	330.	335.	331.	331.	332.	333.	335.	337.	340.
343.	346.	349.	351.	354.	356.	358.	359.	361.	362.
363.	364.	365.	365.	366.	366.	367.	367.	367.	368.
369.	368.	368.	369.	371.	375.	381.	390.	401.	412.
426.	429.	434.	439.	442.	445.	449.	451.	453.	456.
458.	461.	463.	467.	475.	486.	500.	514.	523.	527.
525.	520.	513.	504.	495.	486.	482.	477.	472.	469.
463.	458.	451.	444.	437.	430.	423.	416.	413.	406.
400.	394.	393.	386.	383.	380.	377.	375.	373.	371.
369.	367.	366.	364.	363.	361.	360.	359.	357.	356.
355.	354.	353.	353.						

STAGE

280.3	280.3	280.3	280.3	280.3	280.3	280.3	280.3	280.3	280.3
280.3	280.3	280.3	280.3	280.3	280.3	280.3	280.3	280.3	280.3
280.3	280.3	280.3	280.3	280.3	280.3	280.3	280.3	280.3	280.3
280.3	280.3	280.3	280.3	280.3	280.3	280.3	280.3	280.3	280.3
280.3	280.3	280.3	280.3	280.4	280.4	280.5	280.6	280.7	280.9
281.0	281.2	281.3	281.5	281.6	281.7	281.8	281.9	282.0	282.1
282.1	282.2	282.2	282.3	282.3	282.3	282.3	282.3	282.4	282.4
282.4	282.4	282.6	282.4	282.5	282.9	283.1	283.6	284.2	284.8
285.3	285.6	285.9	286.1	285.2	286.4	286.5	286.6	286.7	286.9
287.0	287.1	287.2	287.4	287.7	288.2	288.9	289.5	289.9	290.1
290.0	289.4	289.6	289.0	288.7	288.3	288.1	287.8	287.6	287.4
287.2	286.9	286.7	286.3	286.0	285.7	285.3	285.0	284.7	284.4
284.1	283.9	283.6	283.4	283.2	283.1	282.9	282.8	282.7	282.6
282.4	282.4	282.3	282.2	282.1	282.0	282.0	281.9	281.8	281.8
281.7	281.6	281.6	281.6						

PEAK OUTFLOW IS 10427. AT TIME 16.67 HOURS

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	10427.	9407.	1550.	1550.	223176.
CMS	295.	193.	44.	44.	6320.
INCHES		17.96	20.60	20.60	20.60
MM		456.25	523.13	523.13	523.13
AC-FT		2601.	3074.	3074.	3074.
THOUS CU M		3207.	3792.	3792.	3792.

HYDROGRAPH ROUTING

ROUTED FLOWS THROUGH REFLINE 1

ISTAO	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
3	1	0	0	0	0	1	0	0

ROUTING DATA

QLOSS	CLOSS	AVG	IRES	ISAME	IOPT	IPMP	LSTR
0.0	0.000	0.00	1	1	0	0	0

NSTPS	NSTOL	LAG	AMSKK	X	TSK	STORA	ISPRAT
3	0	0	0.000	0.000	0.000	89.	0

CAPACITY=	0.	9.	49.	89.	110.	199.	290.	
ELEVATION=	257.	260.	265.	268.	270.	275.	280.	

CREL	SPWID	COOL	EXPW	ELEVL	COOL	CAREA	EXPL
290.2	30.0	3.2	1.5	0.0	0.0	0.0	0.0

DAM DATA

TOPEL	COOD	EXPD	DAMWID
272.2	2.6	1.5	160.

STATION 3, PLAN 1, RATIO 4

END-OF-PERIOD HYDROGRAPH ORDINATES

OUTFLOW

0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	1.	1.	1.	1.
11.	20.	32.	51.	72.	98.	129.	154.	183.	210.
236.	260.	282.	304.	317.	331.	343.	353.	361.	368.
376.	379.	384.	389.	389.	421.	436.	510.	622.	795.
1360.	1429.	1986.	2491.	2867.	3147.	3376.	3576.	3769.	3948.
4146.	4329.	4506.	4751.	5175.	5870.	6960.	8273.	9463.	10173.
10390.	10240.	9483.	8719.	7917.	7207.	6614.	6110.	5689.	5309.
4919.	4520.	4139.	3663.	3209.	2769.	2362.	2005.	1697.	1451.
1302.	1176.	1062.	962.	873.	798.	732.	673.	622.	576.
535.	498.	465.	435.	404.	375.	349.	327.	306.	287.
270.	254.	240.	227.						

STORAGE

85.	85.	85.	85.	85.	85.	85.	85.	85.	85.
85.	85.	85.	85.	85.	85.	85.	85.	85.	85.
85.	85.	85.	85.	85.	85.	85.	85.	85.	85.
85.	85.	85.	85.	85.	85.	85.	85.	85.	85.
85.	85.	85.	85.	85.	85.	85.	85.	86.	86.
87.	88.	90.	91.	93.	94.	96.	98.	99.	101.
102.	103.	104.	105.	106.	106.	107.	107.	109.	109.
109.	109.	109.	109.	109.	110.	112.	115.	119.	126.
136.	148.	159.	166.	171.	174.	177.	179.	182.	184.
186.	189.	190.	192.	196.	204.	215.	227.	239.	244.
245.	243.	238.	231.	224.	217.	211.	206.	202.	198.
194.	190.	185.	180.	175.	170.	166.	159.	154.	149.
144.	140.	136.	132.	129.	126.	124.	121.	119.	117.
115.	114.	112.	111.	109.	108.	107.	106.	105.	104.
104.	103.	102.	102.						

STAGE

268.2	268.2	268.2	268.2	268.2	268.2	268.2	268.2	268.2	268.2
268.2	268.2	268.2	268.2	268.2	268.2	268.2	268.2	268.2	268.2
268.2	268.2	268.2	268.2	268.2	268.2	268.2	268.2	268.2	268.2
268.2	268.2	268.2	268.2	268.2	268.2	268.2	268.2	268.2	268.2
268.2	268.2	268.2	268.2	268.2	268.2	268.2	268.2	268.3	268.3
268.4	268.4	268.5	268.6	268.8	268.9	269.0	269.1	269.2	269.3
269.4	269.5	269.6	269.6	269.7	269.7	269.8	269.8	269.8	269.8
269.9	269.9	269.9	269.9	269.9	270.0	270.1	270.3	270.5	270.9
271.5	272.2	272.9	273.3	273.6	273.8	273.9	274.1	274.2	274.3
274.5	274.6	274.7	274.8	275.1	275.3	276.0	276.7	277.2	277.6
277.8	277.9	277.2	276.9	276.5	276.2	275.9	275.6	275.4	275.1
274.9	274.7	274.4	274.1	273.8	273.5	273.2	272.9	272.6	272.3
272.0	271.9	271.5	271.3	271.1	271.0	270.8	270.7	270.5	270.4
270.3	270.2	270.1	270.0	269.9	269.9	269.8	269.7	269.7	269.6
269.9	269.9	269.4	269.4						

PEAK OUTFLOW IS 10390. AT TIME 16.83 HOURS

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	10390.	5304.	1961.	1961.	221970.
CMS	293.	132.	44.	44.	6283.
INCHES		17.88	20.48	20.48	20.48
MM		454.03	520.31	520.31	520.31
AC-FT		2688.	3697.	3697.	3697.
THOUS CU M		3291.	3771.	3771.	3771.

D-20

HYDROGRAPH ROUTING

CHANNEL ROUTING -MODIFIED PULS- STATION 3 TO 4

ISTAO	ICONP	ICON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
4	1	0	0	0	0	1	0	0

ROUTING DATA

QLOSS	CLOSS	AVG	IRES	ISAME	IOPT	IPMP	LSTR
0.0	0.000	0.00	1	1	0	0	0

NSTPS	NSTDL	LAG	AMSKK	X	TSK	STORA	ISPRAT
1	0	0	0.000	0.000	0.000	0.	0

NORMAL DEPTH CHANNEL ROUTING

QMIN(1)	QMIN(2)	QMIN(3)	ELMVT	ELMAX	RLNTH	SEL
.1000	.0450	.1000	257.0	298.0	150.	.00000

CROSS SECTION COORDINATES--STA,ELEV,STA,ELEV--ETC

0.00 298.00 150.00 280.00 490.00 261.00 500.00 257.00 525.00 257.00
535.00 261.00 700.00 280.00 1150.00 298.00

STORAGE	0.00	.10	.48	.74	1.34	2.21	3.36	4.79	6.58	8.68
	10.73	13.26	16.07	19.16	22.62	26.49	31.34	36.71	42.65	49.22
OUTFLOW	0.00	178.02	978.60	1310.03	2444.42	4058.91	6209.49	8992.66	12468.11	16699.98
	21749.93	27675.71	34535.41	42383.01	50217.17	59305.72	70756.67	83744.82	98636.58	115541.96
STAGE	257.00	258.74	260.47	262.21	263.95	265.68	267.42	269.16	270.89	272.63
	274.37	276.11	277.84	279.58	281.32	283.05	284.79	286.53	288.26	290.00
FLOW	0.00	178.02	978.60	1310.03	2444.42	4058.91	6209.49	8992.66	12468.11	16699.98
	21749.93	27675.71	34535.41	42383.01	50217.17	59305.72	70756.67	83744.82	98636.58	115541.96

STATION 4, PLAN 1, RTIO 1

STATION 4, PLAN 1, RTIO 4

OUTFLOW

0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	1.	1.	2.	9.
10.	19.	32.	49.	71.	96.	123.	152.	181.	210.
233.	260.	281.	330.	310.	331.	342.	353.	361.	360.
374.	470.	384.	399.	399.	420.	454.	516.	617.	709.
1057.	1497.	1951.	2479.	2050.	3141.	3362.	3571.	3750.	3954.
4337.	4370.	4497.	4746.	9193.	9047.	8911.	8224.	9421.	10159.
10351.	10048.	9507.	8746.	7946.	7231.	6634.	6139.	5765.	5314.
4934.	4535.	4121.	3601.	3227.	2706.	2377.	2010.	1700.	1461.
1360.	1190.	1044.	966.	877.	801.	733.	675.	623.	577.
537.	499.	466.	436.	406.	376.	350.	327.	307.	288.
271.	255.	240.	227.						

STOR

0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1.	1.	1.	1.	2.	2.	2.	2.	2.	2.
2.	2.	2.	3.	3.	3.	4.	4.	3.	3.
3.	4.	3.	3.	4.	4.	4.	3.	3.	3.
3.	2.	2.	2.	2.	2.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.						

STAGE

257.0	257.0	257.0	257.0	257.0	257.0	257.0	257.0	257.0	257.0
257.0	257.0	257.0	257.0	257.0	257.0	257.0	257.0	257.0	257.0
257.0	257.0	257.0	257.0	257.0	257.0	257.0	257.0	257.0	257.0
257.0	257.0	257.0	257.0	257.0	257.0	257.0	257.0	257.0	257.0
257.0	257.0	257.0	257.0	257.0	257.0	257.0	257.0	257.0	257.1
257.1	257.2	257.3	257.5	257.7	258.0	258.3	258.6	258.9	258.9
259.0	259.1	259.2	259.3	259.4	259.4	259.5	259.5	259.5	259.6
259.6	259.8	259.5	259.7	259.7	259.8	259.9	260.2	260.6	261.0
261.6	262.4	263.2	264.0	264.4	264.7	264.9	265.2	265.4	265.6
265.8	265.9	266.0	266.2	266.6	267.1	267.9	268.7	269.4	269.7
269.6	269.7	269.4	269.0	268.5	268.1	267.7	267.4	267.0	266.7
266.4	266.1	265.7	265.3	264.8	264.3	263.8	263.3	262.8	262.4
262.2	261.9	261.6	261.4	261.2	261.0	260.8	260.7	260.6	260.5
260.3	260.1	260.0	259.9	259.7	259.6	259.5	259.4	259.3	259.2
259.2	259.1	259.0	259.0						

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	10351.	5301.	1541.	1541.	221955.
CMS	293.	152.	44.	44.	6285.
INCHES		17.80	20.40	20.40	20.40
MM		454.65	520.27	520.27	520.27
AC-FT		2660.	3057.	3057.	3057.
THOUS CU M		3281.	3771.	3771.	3771.

MAXIMUM STORAGE = 9.

MAXIMUM STAGE IS 269.0

HYDROGRAPH ROUTING

CHANNEL ROUTING -MODIFIED PULS- STATION 4 TO 5

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
5	1	0	0	0	0	1	0	0

ROUTING DATA

QLOSS	CLOSS	AVG	IRES	ISAME	IOPT	IPMP		LSTR
0.0	0.000	0.00	1	1	0	0		0

NSTPS	NSTDL	LAG	AMSKK	X	TSK	STORA	ISPRAT
1	0	0	0.000	0.000	0.000	0.	0

NORMAL DEPTH CHANNEL ROUTING

QN(1)	QN(2)	QN(3)	ELNVT	ELMAX	RLNTH	SEL
.0650	.0450	.0650	250.0	280.0	2250.	.00400

CROSS SECTION COORDINATES--STA,ELEV,STA,ELEV--ETC
0.00 290.00 1000.00 260.00 1150.00 253.00 1150.00 250.00 1175.00 250.00
1175.00 253.00 1200.00 260.00 1400.00 280.00

STORAGE	0.00	2.94	4.10	9.10	19.31	34.90	54.75	80.00	119.03	157.64
	200.61	257.95	335.07	411.79	496.21	569.03	690.23	799.79	917.73	1044.63
OUTFLOW	0.00	103.94	309.40	710.06	1611.79	3200.02	5692.45	9614.95	13746.53	20255.06
	20773.64	39534.49	52761.01	68671.13	87469.97	109390.67	134531.24	163176.02	195476.32	231610.09
STAGE	250.00	251.50	253.16	254.74	256.32	257.89	259.47	261.05	262.63	264.21
	265.79	267.37	268.95	270.53	272.11	273.68	275.26	276.84	278.42	280.00
FLOW	0.00	103.94	309.40	710.06	1611.79	3200.02	5692.45	9614.95	13746.53	20255.06
	20773.64	39534.49	52761.01	68671.13	87469.97	109390.67	134531.24	163176.02	195476.32	231610.09

STATION 9, PLAN 1, RTIO 4

OUTFLOW

0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	1.	1.	3.
9.	10.	18.	30.	45.	65.	88.	119.	150.	190.
216.	241.	265.	285.	304.	310.	331.	343.	353.	361.
360.	374.	379.	394.	391.	404.	428.	459.	539.	656.
954.	1140.	1547.	2101.	2574.	2920.	3203.	3444.	3640.	3839.
4620.	4217.	4342.	4634.	4918.	5491.	6314.	7426.	8730.	9752.
16242.	10228.	9613.	9144.	8302.	7641.	6979.	6423.	5952.	5541.
5157.	4771.	4365.	3940.	3495.	3061.	2650.	2271.	1960.	1640.
1443.	1202.	1164.	1052.	953.	867.	792.	726.	673.	620.
575.	534.	447.	464.	433.	403.	375.	349.	326.	305.
284.	267.	251.	237.						

STOR

0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	1.	1.	1.	2.	2.	3.	3.
3.	2.	4.	4.	4.	4.	4.	5.	5.	5.
5.	5.	5.	5.	5.	5.	6.	6.	7.	8.
11.	14.	19.	24.	28.	32.	34.	36.	39.	40.
41.	43.	44.	46.	48.	53.	60.	69.	79.	86.
90.	90.	87.	82.	76.	70.	65.	60.	57.	54.
50.	47.	44.	40.	37.	33.	29.	26.	22.	26.
17.	16.	14.	13.	12.	11.	10.	9.	9.	8.
7.	7.	6.	6.	6.	5.	5.	5.	4.	4.
4.	4.	4.	3.						

STAGE

250.0	250.0	250.0	250.0	250.0	250.0	250.0	250.0	250.0	250.0
250.0	250.0	250.0	250.0	250.0	250.0	250.0	250.0	250.0	250.0
250.0	250.0	250.0	250.0	250.0	250.0	250.0	250.0	250.0	250.0
250.0	250.0	250.0	250.0	250.0	250.0	250.0	250.0	250.0	250.0
250.0	250.0	250.0	250.0	250.0	250.0	250.0	250.0	250.0	250.0
250.1	250.2	250.3	250.5	250.7	251.0	251.3	251.7	252.0	252.2
252.4	252.6	252.8	253.0	253.1	253.2	253.2	253.3	253.3	253.4
253.4	253.4	253.4	253.6	253.5	253.5	253.6	253.8	254.0	254.5
255.6	255.5	256.2	256.9	257.3	257.6	257.9	258.0	258.2	258.3
259.4	259.5	259.6	259.9	259.0	259.3	259.8	260.3	260.9	261.3
261.5	261.9	261.3	261.1	260.8	260.4	260.1	259.8	259.6	259.4
259.1	258.9	258.6	258.4	258.1	257.7	257.4	257.0	256.6	256.3
256.0	255.8	255.5	255.3	255.2	255.0	254.9	254.7	254.6	254.4
254.2	254.0	253.9	253.8	253.6	253.5	253.4	253.3	253.2	253.1
253.6	252.9	252.7	252.6						

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	16242.	5373.	1940.	1940.	221769.
CMS	260.	152.	44.	44.	6270.
INCHES		17.69	20.46	20.46	20.46
MM		453.41	519.69	519.69	519.69
AC-FT		2664.	3054.	3054.	3054.
THOUS CU M		3286.	3767.	3767.	3767.

MAXIMUM STORAGE = 90.

MAXIMUM STAGE IS 261.9

D-24

S2-d

PEAK FLOW AND STORAGE (END OF PERIOD) SUMMARY FOR MULTIPLE PLAN-RATIO ECONOMIC COMPUTATIONS
FLOWS IN CUBIC FEET PER SECOND (CUBIC METERS PER SECOND)
AREA IN SQUARE MILES (SQUARE KILOMETERS)

OPERATION	STATION	AREA	PLAN	RATIO 1 .15	RATIO 2 .25	RATIOS APPLIED TO FLOWS RATIO 3 .50	RATIO 4 1.00
HYDROGRAPH AT	1	2.99	1	1941.	2635.	5271.	10542.
	(	7.25)	(	54.78)(	74.63)(	149.26)(	298.52)(
ROUTED TO	2	2.99	1	1460.	2546.	5165.	10427.
	(	7.25)	(	41.36)(	72.09)(	146.26)(	295.25)(
ROUTED TO	3	2.99	1	1326.	2494.	5113.	10350.
	(	7.25)	(	37.54)(	70.33)(	144.78)(	293.07)(
ROUTED TO	4	2.99	1	1320.	2494.	5111.	10351.
	(	7.25)	(	37.39)(	70.33)(	144.76)(	293.10)(
ROUTED TO	5	2.80	1	1305.	2453.	5077.	10242.
	(	7.25)	(	36.95)(	69.46)(	143.76)(	290.03)(

No BREACH

SUMMARY OF DAM SAFETY ANALYSIS

PLAN 2 ..... INITIAL VALUE SPILLWAY CREST TOP OF DAM

	ELEVATION	280.30	290.30	294.30
	STORAGE	330.	330.	462.
	OUTFLOW	0.	0.	1046.

RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
.19	284.87	.57	413.	1668.	1.33	16.83	0.00
.29	285.91	1.61	433.	2946.	3.33	16.83	0.00
.50	287.49	3.19	470.	5169.	5.67	16.67	0.00
1.00	290.00	5.76	527.	10427.	6.83	16.67	0.00

SUMMARY OF DAM SAFETY ANALYSIS

PLAN 3 ..... INITIAL VALUE SPILLWAY CREST TOP OF DAM

	ELEVATION	268.20	268.20	272.20
	STORAGE	85.	85.	147.
	OUTFLOW	0.	0.	1460.

RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
.19	272.69	0.00	145.	1320.	0.00	17.33	0.00
.29	273.29	1.09	164.	2484.	2.17	17.00	0.00
.50	275.04	2.84	196.	5113.	4.83	16.83	0.00
1.00	277.64	5.44	269.	10350.	6.50	16.83	0.00

PLAN 1 STATION 4

RATIO	MAXIMUM FLOW,CFS	MAXIMUM STAGE,FT	TIME HOURS
.19	1320.	262.2	17.33
.29	2484.	264.0	17.00
.50	5111.	266.5	16.83
1.00	10351.	269.8	16.83

PLAN 1 STATION 5

RATIO	MAXIMUM FLOW,CFS	MAXIMUM STAGE,FT	TIME HOURS
.19	1335.	255.8	17.50
.29	2453.	257.1	17.17
.50	5077.	259.1	17.00
1.00	10242.	261.5	16.83

Dam Breach Analysis

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**********
FLOOD HYDROGRAPH PACKAGE (HEC-1)
DAM SAFETY VERSION  JULY 1978
  LAST MODIFICATION  25 SEP 78
**********
    1            A1     NEW JERSEY DAM SAFETY - SKYLINE NO. 1 & 2, I.D. NO. 08203 & 08208
    2            A2     HYDRAULIC-HYDROLOGIC ANALYSIS   302-83
    3            A3     PROBABLE MAXIMUM FLOOD                                          -ROE-
    4            B   144       0      10       0       0       0       0       0       0       0
    5            B1    5
    6            J     1       4       1
    7            J1 0.15    0.25     0.5     1.0
    8            K     0       1                                               1
    9            K1     RUNOFF FROM AREA ABOVE SKYLINE LAKE NO. 2
   10            M     1       2     2.0             2.6
   11            P            22.0     112     123     133
   12            T                                                    1.0    0.10
   13            W2           1.0
   14            X    -1    -.05     2.0
   15            K     1       2                                               1
   16            K1                 ROUTED FLOWS THROUGH SKYLINE 2
   17            Y                                 1       1
   18            Y1    1                                                      330
   19            S5    0      10      70     170     330     415     525     670
   20            SE 245.3     253     260     270   280.3     285     290     295
   21            S1 280.1      50     2.6     1.5
   22            S0 284.3     2.6     1.5     150
   23            C0   100       0   262.6       3   266.3   264.3
   24            K     1       3                                               1
   25            K1               ROUTED FLOWS THROUGH SKYLINE 1
   26            Y                                 1       1
   27            Y1    1                                                       85
   28            S5    0       5      45      65     110     195     290
   29            SE 257.3     260     265   260.2     270     275     280
   30            S1 260.2      50     3.5     1.5
   31            S0 272.2     2.6     1.5     150
   32            C0   160       0   259.3       1   260.2   272.2
   33            K     1       4                                               1
   34            K1     CHANNEL ROUTING -MODIFIED PULS- STATION 3 TO 4
   35            Y                                 1       1
   36            Y1    1
   37            Y6   0.1   0.045     0.1     257     290     150    .006
   34            Y7     0     290     150     260     490     261     500     257     525     257
   39            Y7   535     261     700     260    1150     290
   40            K     1       5                                               1
   41            K1     CHANNEL ROUTING -MODIFIED PULS- STATION 3 TO 4
   42            Y                                 1       1
   43            Y1    1
   44            Y6 0.045   0.045   0.045     250     280    2250   0.004
   45            Y7     0     240    1000     260    1150     253    1150     250    1175     250
   46            Y7  1175     253    1300     260    1600     280
   47            K    99
```

PREVIEW OF SEQUENCE OF STREAM NETWORK CALCULATIONS

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*RUNOFF HYDROGRAPH AT          1
 ROUTE HYDROGRAPH TO           2
 ROUTE HYDROGRAPH TO           3
 ROUTE HYDROGRAPH TO           4
 ROUTE HYDROGRAPH TO           5
 END OF NETWORK
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L2-D

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**********************************
FLOOD HYDROGRAPH PACKAGE (HEC-1)
DAM SAFETY VERSION      JULY 1978
  LAST MODIFICATION  25 SEP 78
**********************************

RUN  DATE= 01/29/79
     TIME= 20.50.33.

            NEW JERSEY DAM SAFETY - SKYLINE NO. 1 + 2, I.D. NO. 00203 + 00200
            HYDRAULIC-HYDROLOGIC ANALYSIS   302-33
            PROBABLE MAXIMUM FLOOD                                      -ABE-

                                     JOB SPECIFICATION
           NQ      NHR    NMIN    IDAY    IHR    IMIN   METRC    IPLT    IPRT   NSTAN
          144        0      10       0      0       0       0       0       0       0
                                  JOPER    NWT   LROPT   TRACE
                                      5      0       0       0

                            MULTI-PLAN ANALYSES TO BE PERFORMED
                               NPLAN= 1 NRTIO= 4 LRTIO= 1
       RTIOS=    .15    .25    .50   1.00

 *********          *********          *********          *********          *********

                                SUB-AREA RUNOFF COMPUTATION

             RUNOFF FROM AREA ABOVE SKYLINE LAKE NO. 2

                    ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
                        1       0       0       0       0       0       1       0       0

                                     HYDROGRAPH DATA
          IHYDG    IUHG   TAREA    SNAP   TRSDA   TRSPC   RATIO   ISNOW   ISAME   LOCAL
              1       2    2.80    0.00    2.81    0.06   0.000       0       0       0

                                      PRECIP DATA
                SPFE     PMS      R6     R12     R24     R48     R72     R96
                0.00   22.00  112.00  123.00  133.00    0.00    0.00    0.00
TRSPC COMPUTED BY THE PROGRAM IS  .800

                                       LOSS DATA
       LROPT  STRKR   DLTKR   RTIOL   ERAIN   STRKS   RTIOK   STRTL   CNSTL   ALSMX   RTIMP
          0    0.00    0.10    1.00    0.00    0.00    1.00    1.00     .10    0.00    0.00

                                 UNIT HYDROGRAPH DATA
                              TC=  0.00    LAG=  1.00

                                    RECESSION DATA
                      STRTQ=   -1.00    QRCSN=   -.05    RTIOR= 2.00

         UNIT HYDROGRAPH 32 END OF PERIOD ORDINATES, TC=   0.00 HOURS, LAG=  1.00  VOL= 1.00
       84.      249.      510.      855.     1119.     1239.     1239.     1134.      989.      791.
      584.      452.      349.      279.      218.      168.      131.      102.       79.       61.
       48.       37.       29.       23.       18.       14.       11.        9.        7.        5.
        3.        1.
```

PD.HR	HR.MN	PERIOD	RAIN	EXCS	LOSS	END-OF-PERIOD FLOW COMP Q	PD.HR	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP Q
1.01	.10	1	.02	0.00	.02	3.	1.01	12.10	73	.33	.31	.02	425.
1.01	.20	2	.02	0.00	.02	2.	1.01	12.20	74	.33	.31	.02	464.
1.01	.30	3	.02	0.00	.02	2.	1.01	12.30	75	.33	.31	.02	634.
1.01	.40	4	.02	0.00	.02	2.	1.01	12.40	76	.33	.31	.02	869.
1.01	.50	5	.02	0.00	.02	2.	1.01	12.50	77	.33	.31	.02	1170.
1.01	1.00	6	.02	0.00	.02	2.	1.01	13.00	78	.33	.31	.02	1518.
1.01	1.10	7	.02	0.00	.02	2.	1.01	13.10	79	.33	.31	.02	1862.
1.01	1.20	8	.02	0.00	.02	2.	1.01	13.20	80	.34	.32	.02	2180.
1.01	1.30	9	.02	0.00	.02	2.	1.01	13.30	81	.34	.32	.02	2455.
1.01	1.40	10	.02	0.00	.02	1.	1.01	13.40	82	.34	.32	.02	2709.
1.01	1.50	11	.02	0.00	.02	1.	1.01	13.50	83	.34	.32	.02	3003.
1.01	2.00	12	.02	0.00	.02	1.	1.01	14.00	84	.34	.32	.02	3268.
1.01	2.10	13	.02	0.00	.02	1.	1.01	14.10	85	.44	.42	.02	3396.
1.01	2.20	14	.02	0.00	.02	1.	1.01	14.20	86	.44	.42	.02	3570.
1.01	2.30	15	.02	0.00	.02	1.	1.01	14.30	87	.44	.42	.02	3745.
1.01	2.40	16	.02	0.00	.02	1.	1.01	14.40	88	.44	.42	.02	3927.
1.01	2.50	17	.02	0.00	.02	1.	1.01	14.50	89	.44	.42	.02	4112.
1.01	3.00	18	.02	0.00	.02	1.	1.01	15.00	90	.44	.42	.02	4292.
1.01	3.10	19	.02	0.00	.02	1.	1.01	15.10	91	.43	.41	.02	4455.
1.01	3.20	20	.02	0.00	.02	1.	1.01	15.20	92	.73	.71	.02	4616.
1.01	3.30	21	.02	0.00	.02	1.	1.01	15.30	93	1.35	1.33	.02	4844.
1.01	3.40	22	.02	0.00	.02	1.	1.01	15.40	94	3.37	3.35	.02	5329.
1.01	3.50	23	.02	0.00	.02	1.	1.01	15.50	95	.97	.96	.02	6267.
1.01	4.00	24	.02	0.00	.02	1.	1.01	16.00	96	.60	.59	.02	7521.
1.01	4.10	25	.02	0.00	.02	0.	1.01	16.10	97	.46	.44	.02	8995.
1.01	4.20	26	.02	0.00	.02	0.	1.01	16.20	98	.46	.44	.02	10042.
1.01	4.30	27	.02	0.00	.02	0.	1.01	16.30	99	.46	.44	.02	10542.
1.01	4.40	28	.02	0.00	.02	0.	1.01	16.40	100	.46	.44	.02	10543.
1.01	4.50	29	.02	0.00	.02	0.	1.01	16.50	101	.46	.44	.02	10023.
1.01	5.00	30	.02	0.00	.02	0.	1.01	17.00	102	.46	.44	.02	9317.
1.01	5.10	31	.02	0.00	.02	0.	1.01	17.10	103	.36	.34	.02	8421.
1.01	5.20	32	.02	0.00	.02	0.	1.01	17.20	104	.36	.34	.02	7523.
1.01	5.30	33	.02	0.00	.02	0.	1.01	17.30	105	.36	.34	.02	6693.
1.01	5.40	34	.02	0.00	.02	0.	1.01	17.40	106	.36	.34	.02	6283.
1.01	5.50	35	.02	0.00	.02	0.	1.01	17.50	107	.36	.34	.02	5924.
1.01	6.00	36	.02	0.00	.02	0.	1.01	18.00	108	.36	.34	.02	5621.
1.01	6.10	37	.05	0.00	.05	0.	1.01	18.10	109	.03	.01	.02	5367.
1.01	6.20	38	.05	0.00	.05	0.	1.01	18.20	110	.03	.01	.02	4972.
1.01	6.30	39	.05	0.00	.05	0.	1.01	18.30	111	.03	.01	.02	4270.
1.01	6.40	40	.05	0.00	.05	0.	1.01	18.40	112	.03	.01	.02	3402.
1.01	6.50	41	.05	0.00	.05	0.	1.01	18.50	113	.03	.01	.02	3241.
1.01	7.00	42	.05	.02	.04	2.	1.01	19.00	114	.03	.01	.02	2771.
1.01	7.10	43	.05	.04	.02	8.	1.01	19.10	115	.03	.01	.02	2276.
1.01	7.20	44	.05	.04	.02	22.	1.01	19.20	116	.03	.01	.02	1836.
1.01	7.30	45	.05	.04	.02	47.	1.01	19.30	117	.03	.01	.02	1453.
1.01	7.40	46	.05	.04	.02	84.	1.01	19.40	118	.03	.01	.02	1150.
1.01	7.50	47	.05	.04	.02	127.	1.01	19.50	119	.03	.01	.02	925.
1.01	8.00	48	.05	.04	.02	173.	1.01	20.00	120	.03	.01	.02	753.
1.01	8.10	49	.05	.04	.02	217.	1.01	20.10	121	.03	.01	.02	619.
1.01	8.20	50	.05	.04	.02	257.	1.01	20.20	122	.03	.01	.02	521.
1.01	8.30	51	.05	.04	.02	290.	1.01	20.30	123	.03	.01	.02	446.
1.01	8.40	52	.05	.04	.02	315.	1.01	20.40	124	.03	.01	.02	456.
1.01	8.50	53	.05	.04	.02	333.	1.01	20.50	125	.03	.01	.02	423.
1.01	9.00	54	.05	.04	.02	350.	1.01	21.00	126	.03	.01	.02	395.
1.01	9.10	55	.05	.04	.02	361.	1.01	21.10	127	.03	.01	.02	369.
1.01	9.20	56	.05	.04	.02	370.	1.01	21.20	128	.03	.01	.02	344.
1.01	9.30	57	.05	.04	.02	378.	1.01	21.30	129	.03	.01	.02	321.
1.01	9.40	58	.05	.04	.02	383.	1.01	21.40	130	.03	.01	.02	299.
1.01	9.50	59	.05	.04	.02	387.	1.01	21.50	131	.03	.01	.02	279.
1.01	10.00	60	.05	.04	.02	391.	1.01	22.00	132	.03	.01	.02	261.
1.01	10.10	61	.05	.04	.02	393.	1.01	22.10	133	.03	.01	.02	243.
1.01	10.20	62	.05	.04	.02	395.	1.01	22.20	134	.03	.01	.02	227.
1.01	10.30	63	.05	.04	.02	397.	1.01	22.30	135	.03	.01	.02	212.
1.01	10.40	64	.05	.04	.02	398.	1.01	22.40	136	.03	.01	.02	197.
1.01	10.50	65	.05	.04	.02	399.	1.01	22.50	137	.03	.01	.02	184.
1.01	11.00	66	.05	.04	.02	400.	1.01	23.00	138	.03	.01	.02	172.
1.01	11.10	67	.05	.04	.02	401.	1.01	23.10	139	.03	.01	.02	160.
1.01	11.20	68	.05	.04	.02	401.	1.01	23.20	140	.03	.01	.02	150.
1.01	11.30	69	.05	.04	.02	401.	1.01	23.30	141	.03	.01	.02	143.
1.01	11.40	70	.05	.04	.02	402.	1.01	23.40	142	.03	.01	.02	137.
1.01	11.50	71	.05	.04	.02	402.	1.01	23.50	143	.03	.01	.02	137.
1.01	12.00	72	.05	.04	.02	402.	1.02	0.00	144	.03	.01	.02	137.
									SUM	23.41	20.70	2.71	224997.
										(595.1(	526.1(	69.1(	6368.3)

HYDROGRAPH AT STA 1 FOR PLAN 1, RTIO 4

3.	2.	2.	2.	2.	2.	2.	2.	2.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	2.	8.	27.	47.	84.	127.	173.	217.	257.
290.	319.	335.	350.	361.	370.	376.	383.	387.	391.
393.	399.	397.	398.	399.	400.	401.	401.	401.	402.
402.	492.	423.	496.	634.	869.	1176.	1516.	1862.	2190.
2493.	2769.	3003.	3208.	3394.	3570.	3745.	3927.	4112.	4292.
4453.	4616.	4844.	5379.	6247.	7521.	8955.	10042.	10542.	10503.
10029.	9317.	9421.	7523.	6043.	6283.	5028.	5421.	5042.	4672.
4278.	3902.	3591.	2771.	2276.	1834.	1453.	1150.	929.	753.
618.	521.	486.	454.	423.	395.	369.	344.	321.	299.
279.	261.	243.	227.	212.	197.	184.	172.	160.	150.
140.	137.	137.	137.						

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	10542.	5429.	1561.	1561.	224830.
CMS	299.	154.	44.	44.	6366.
INCHES		18.04	20.79	20.79	20.79
MM		458.12	527.81	527.81	527.81
AC-FT		2692.	3097.	3097.	3097.
THOUS CU M		3321.	3820.	3820.	3820.

OE-D

HYDROGRAPH ROUTING

ROUTED FLOWS THROUGH SKYLINE 2

ISTAQ	ICONP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
2	1	0	0	0	0	1	0	0

ROUTING DATA

GLOSS	CLOSS	AVG	IPES	ISAME	IOPT	IPMP	LSTR
0.0	0.000	0.00	1	1	0	0	0

NSTPS	NSTOL	LAG	AMSKK	X	TSK	STORA	ISPRAT
1	0	0	0.000	0.000	0.000	338.	0

CAPACITY=	0.	10.	70.	170.	330.	415.	525.	670.
ELEVATION=	245.	250.	260.	270.	280.	285.	290.	295.

CREL	SPWID	COOH	EXPW	ELEVL	COOL	CAREA	EXPL
280.3	50.0	2.6	1.5	0.0	0.6	0.0	0.0

DAM DATA

TOPEL	COXD	EXPD	DAMWID
284.3	2.6	1.5	100.

DAM BREACH DATA

BRWID	Z	ELBM	TFAIL	MSEL	FAILEL
100.	0.00	262.00	0.01	280.30	284.30

STATION 2, PLAN 1, RATIO 4

BEGIN CAN FAILURE AT 13.33 HOURS

END-OF-PERIOD HYDROGRAPH ORDINATES

OUTFLOW

0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	1.	1.	2.	5.	10.	20.	34.	54.
79.	107.	136.	166.	195.	222.	247.	270.	290.	308.
323.	335.	347.	357.	365.	371.	377.	382.	385.	388.
391.	393.	397.	409.	448.	504.	615.	783.	1037.	1370.
2774.	3446.	3958.	4304.	4578.	4811.	5265.	5178.	5345.	5525.
5697.	5862.	6059.	6430.	7134.	8199.	9549.	10868.	10414.	10345.
10288.	9566.	8739.	7841.	7882.	6492.	6881.	5582.	5157.	4828.
4444.	4012.	3528.	3022.	2529.	2074.	1676.	1343.	1063.	883.
724.	606.	532.	488.	453.	428.	395.	369.	345.	322.
311.	282.	261.	246.	230.	219.	201.	186.	176.	164.
154.	146.	141.	139.						

STORAGE

330.	331.	330.	330.	330.	330.	330.	330.	330.	333.
330.	330.	330.	330.	330.	331.	330.	331.	330.	330.
329.	330.	330.	330.	330.	331.	330.	331.	330.	330.
330.	329.	330.	330.	330.	330.	330.	333.	330.	330.
330.	331.	330.	331.	331.	332.	333.	335.	337.	340.
343.	346.	349.	351.	354.	356.	358.	359.	361.	362.
361.	364.	365.	365.	366.	366.	367.	367.	367.	366.
369.	369.	368.	369.	371.	375.	381.	393.	401.	411.
415.	406.	394.	380.	364.	348.	330.	313.	296.	279.
261.	244.	227.	212.	199.	189.	180.	171.	169.	169.
160.	169.	161.	156.	153.	150.	147.	145.	142.	140.
138.	135.	132.	129.	126.	122.	119.	116.	114.	112.
110.	109.	108.	107.	107.	106.	106.	106.	105.	105.
105.	104.	104.	104.	104.	103.	103.	103.	103.	102.
102.	102.	102.	102.						

STAGE

248.3	248.3	248.3	248.3	248.3	248.3	248.3	248.3	248.3	248.3
248.3	248.3	248.3	248.3	248.3	248.3	248.3	248.3	248.3	248.3
248.3	248.3	248.3	248.3	248.3	248.3	248.3	248.3	248.3	248.3
248.3	248.3	248.3	248.3	248.3	248.3	248.3	248.3	248.3	248.3
248.3	248.3	248.3	248.3	248.4	248.4	248.5	248.6	248.7	248.9
249.0	249.2	249.5	249.8	250.2	250.7	251.3	251.8	251.9	252.1
251.8	251.2	251.3	251.5	251.6	251.7	251.8	251.9	252.0	252.1
252.1	252.2	252.2	252.3	252.3	252.3	252.3	252.3	252.4	252.4
252.4	252.4	252.4	252.4	252.6	252.8	253.1	253.6	254.2	254.8
244.9	244.5	243.9	243.1	242.2	241.3	240.3	275.2	274.1	273.0
275.9	274.8	273.7	272.7	271.9	271.2	270.7	270.4	269.9	269.5
269.0	269.5	269.1	268.6	268.3	268.0	267.7	267.5	267.2	267.0
266.0	266.5	266.2	265.9	265.6	265.2	264.9	264.6	264.4	264.2
264.0	263.9	263.8	263.7	263.7	263.6	263.6	263.6	263.5	263.5
263.5	263.4	263.4	263.4	263.4	263.3	263.3	263.3	263.3	263.2
263.2	263.2	263.2	263.2						

PEAK OUTFLOW IS 10868. AT TIME 16.33 HOURS

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	10868.	6816.	1677.	1677.	241557.
CMS	308.	170.	48.	48.	6840.
INCHES		19.99	22.29	22.29	22.29
MM		507.66	566.22	566.22	566.22
AC-FT		2903.	3327.	3327.	3327.
THOUS CU M		3648.	4104.	4104.	4104.

13-D

THE DAM BREACH HYDROGRAPH HAS DEVELOPED USING A TIME INTERVAL OF .056 HOURS DURING BREACH FORMATION.
DOWNSTREAM CALCULATIONS WILL USE A TIME INTERVAL OF .167 HOURS.
THIS TABLE COMPARES THE HYDROGRAPH FOR DOWNSTREAM CALCULATIONS WITH THE COMPUTED BREACH HYDROGRAPH.
INTERMEDIATE FLOWS ARE INTERPOLATED FROM END-OF-PERIOD VALUES.

TIME (HOURS)	TIME FROM BEGINNING OF BREACH (HOURS)	INTERPOLATED BREACH HYDROGRAPH (CFS)	-	COMPUTED BREACH HYDROGRAPH (CFS)	=	ERROR (CFS)	ACCUMULATED ERROR (CFS)	ACCUMULATED ERROR (AC-FT)
13.333	0.000	1570.		1570.		0.	0.	0.
13.389	.056	1972.		2034.		-62.	-62.	-0.
13.444	.111	2374.		2444.		-70.	-132.	-1.
13.500	.167	2776.		2776.		0.	-132.	-1.
13.556	.222	3808.		3841.		-41.	-173.	-1.
13.611	.278	3223.		3258.		-34.	-207.	-1.
13.667	.333	3446.		3446.		0.	-207.	-1.
13.722	.389	3618.		3626.		-8.	-216.	-1.
13.778	.444	3789.		3809.		-20.	-235.	-1.
13.833	.500	3961.		3960.		1.	-235.	-1.
13.889	.556	4075.		4089.		-15.	-250.	-1.
13.944	.611	4189.		4202.		-13.	-262.	-1.
14.000	.667	4304.		4304.		0.	-262.	-1.
14.056	.722	4393.		4398.		-5.	-266.	-1.
14.111	.778	4481.		4486.		-4.	-272.	-1.
14.167	.833	4571.		4573.		0.	-272.	-1.
14.222	.889	4658.		4659.		-1.	-273.	-1.
14.278	.944	4733.		4731.		-1.	-274.	-1.
14.333	1.000	4811.		4811.		0.	-274.	-1.
14.389	1.056	4895.		4891.		4.	-270.	-1.
14.444	1.111	4989.		4974.		6.	-264.	-1.
14.500	1.167	5069.		5069.		0.	-264.	-1.
14.556	1.222	5102.		5093.		12.	-252.	-1.
14.611	1.278	5139.		5129.		10.	-242.	-1.
14.667	1.333	5276.		5276.		0.	-242.	-1.
14.722	1.389	5232.		5229.		3.	-239.	-1.
14.778	1.444	5289.		5246.		3.	-236.	-1.
14.833	1.500	5345.		5345.		0.	-236.	-1.
14.889	1.556	5405.		5405.		0.	-236.	-1.
14.944	1.611	5465.		5465.		0.	-236.	-1.
15.000	1.667	5525.		5525.		0.	-236.	-1.
15.056	1.722	5582.		5584.		-2.	-237.	-1.
15.111	1.778	5648.		5641.		-1.	-239.	-1.
15.167	1.833	5697.		5697.		0.	-239.	-1.
15.222	1.889	5752.		5753.		-0.	-239.	-1.
15.278	1.944	5807.		5814.		-0.	-246.	-1.
15.333	2.000	5862.		5862.		1.	-246.	-1.
15.389	2.056	5924.		5921.		6.	-233.	-1.
15.444	2.111	5993.		5988.		5.	-228.	-1.
15.500	2.167	6059.		6059.		0.	-224.	-1.
15.556	2.222	6185.		6154.		31.	-197.	-1.
15.611	2.278	6312.		6286.		26.	-171.	-1.
15.667	2.333	6438.		6438.		0.	-171.	-1.
15.722	2.389	6670.		6629.		41.	-129.	-1.
15.778	2.444	6902.		6867.		35.	-95.	-0.
15.833	2.500	7134.		7134.		0.	-95.	-0.
15.889	2.556	7489.		7444.		45.	-50.	-0.
15.944	2.611	7844.		7886.		38.	-12.	-0.
16.000	2.667	8199.		8199.		0.	-12.	-0.
16.056	2.722	8649.		8623.		26.	15.	0.
16.111	2.778	9099.		9076.		22.	36.	0.
16.167	2.833	9549.		9549.		0.	36.	0.
16.222	2.889	9969.		10002.		-33.	3.	0.
16.278	2.944	10388.		13415.		-27.	-24.	-0.
16.333	3.000	10808.		10808.		0.	-24.	-0.

HYDROGRAPH ROUTING

ROUTED FLOWS THROUGH SKYLINE 1

ISTAQ	ICCHK	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
3	1	0	0	0	0	1	0	0

ROUTING DATA

CLOSS	CLOSS	AVG	IRES	ISAME	IOPT	IPMP		LSTR
0.0	0.000	0.00	1	1	0	0		0

NSTPS	NSTOL	LAG	AMSKK	X	TSK	STORA	ISPRAT
1	0	0	0.000	0.000	0.000	85.	0

CAPACITY=	0.	5.	45.	85.	110.	195.	290.	
ELEVATION=	257.	260.	265.	268.	275.	275.	280.	

CREL	SPWID	COOH	EXPH	ELEVL	COOL	CAREA	EXPL
268.2	50.0	3.5	1.5	0.0	0.3	6.0	0.0

DAM DATA

TOFEL	COOD	EXPD	DAMWID
272.2	2.6	1.5	160.

DAM BREACH DATA

BRWID	Z	ELBM	TFAIL	MSEL	FAILEL
160.	0.00	259.30	1.06	268.20	272.26

"DVN"

STATION 3, PLAN 1, RATIO 4

BEGIN DAM FAILURE AT 13.67 HOURS

END-OF-PERIOD HYDROGRAPH ORDINATES

OUTFLOW

0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	3.	0.	3.
0.	3.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	6.	0.
0.	0.	0.	0.	0.	0.	1.	1.	3.	6.
11.	25.	33.	51.	72.	98.	125.	154.	183.	218.
236.	263.	282.	308.	317.	331.	343.	353.	361.	366.
374.	377.	384.	389.	399.	421.	456.	519.	622.	816.
1752.	2466.	4624.	5674.	6376.	6622.	6495.	7062.	5482.	5440.
9641.	9805.	9983.	6250.	7053.	7666.	8988.	10246.	10033.	10473.
10371.	9061.	9122.	8286.	7452.	6798.	8156.	5724.	5331.	4960.
6547.	4179.	3723.	3231.	2742.	2202.	1870.	1517.	1230.	1085.
830.	693.	592.	926.	483.	449.	419.	392.	366.	348.
281.	300.	273.	240.	235.	218.	235.	191.	179.	167.
180.	150.	144.	140.						

STORAGE

85.	85.	85.	85.	85.	85.	85.	85.	85.	85.
85.	85.	85.	85.	85.	85.	85.	85.	85.	85.
85.	85.	85.	85.	85.	85.	85.	85.	85.	85.
85.	85.	85.	85.	85.	85.	85.	85.	85.	85.
85.	85.	85.	85.	85.	85.	85.	85.	86.	86.
87.	89.	90.	91.	93.	94.	96.	98.	99.	101.
102.	103.	104.	105.	106.	106.	107.	107.	108.	108.
108.	108.	108.	109.	109.	110.	112.	115.	119.	127.
143.	160.	161.	146.	124.	98.	73.	47.	39.	39.
49.	41.	42.	43.	46.	52.	60.	64.	71.	73.
69.	66.	61.	56.	59.	46.	42.	40.	39.	37.
35.	33.	38.	27.	25.	22.	19.	16.	14.	16.
11.	9.	8.	8.	7.	7.	7.	6.	6.	6.
5.	5.	5.	5.	5.	5.	5.	5.	5.	5.
5.	5.	5.	5.						

STAGE

260.2	260.2	260.2	260.2	260.2	260.2	260.2	260.2	260.2	260.2
260.2	260.2	260.2	260.2	260.2	260.2	260.2	260.2	260.2	260.2
260.2	260.2	260.2	260.2	260.2	260.2	260.2	260.2	260.2	260.2
260.2	260.2	260.2	260.2	260.2	260.2	260.2	260.2	260.2	260.2
260.2	260.2	259.2	260.2	260.2	260.2	260.2	260.2	260.3	260.3
268.4	268.4	259.5	268.6	258.8	268.9	269.0	269.1	269.2	269.3
269.4	269.5	269.6	269.6	269.7	269.7	269.8	269.8	269.8	269.8
269.9	269.9	269.9	269.9	269.9	270.6	270.1	270.3	270.5	271.6
271.9	273.0	273.0	272.1	270.0	269.2	267.3	265.2	264.2	264.3
264.4	264.5	264.6	264.8	265.1	265.5	266.2	266.9	267.1	267.0
266.9	266.7	266.3	265.9	265.4	265.0	264.7	264.4	264.2	264.0
263.7	263.5	263.1	262.8	262.4	262.1	261.7	261.4	261.1	260.9
260.7	260.6	260.4	260.3	260.3	260.2	260.2	260.2	260.1	260.1
260.1	260.0	260.0	259.9	259.9	259.9	259.9	259.8	259.8	259.8
259.8	259.8	259.7	259.7						

PEAK OUTFLOW IS 10633. AT TIME 16.50 HOURS

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	10633.	6259.	1719.	1719.	247470.
CMS	301.	177.	49.	49.	7008.
INCHES		20.79	22.04	22.04	22.04
MM		528.17	560.08	560.08	560.08
AC-FT		3104.	3409.	3409.	3409.
THOUS CU M		3828.	4205.	4205.	4205.

SE-D

THE DAM BREACH HYDROGRAPH WAS DEVELOPED USING A TIME INTERVAL OF .021 HOURS DURING BREACH FORMATION.
DOWNSTREAM CALCULATIONS WILL USE A TIME INTERVAL OF .167 HOURS.
THIS TABLE COMPARES THE HYDROGRAPH FOR DOWNSTREAM CALCULATIONS WITH THE COMPUTED BREACH HYDROGRAPH.
INTERMEDIATE FLOWS ARE INTERPOLATED FROM END-OF-PERIOD VALUES.

TIME (HOURS)	TIME FROM BEGINNING OF BREACH (HOURS)	INTERPOLATED BREACH HYDROGRAPH (CFS)	- COMPUTED BREACH HYDROGRAPH (CFS)	= ERROR (CFS)	ACCUMULATED ERROR (CFS)	ACCUMULATED ERROR (AC-FT)
13.667	0.833	2486.	2486.	0.	0.	0.
13.688	.854	2683.	2764.	-81.	-81.	-0.
13.708	.875	2960.	3111.	-150.	-231.	-0.
13.729	.896	3230.	3433.	-195.	-427.	-1.
13.750	.917	3515.	3726.	-211.	-638.	-1.
13.771	.938	3792.	3989.	-197.	-835.	-1.
13.792	.958	4070.	4224.	-155.	-990.	-2.
13.813	.979	4347.	4435.	-88.	-1078.	-2.
13.833	1.000	4624.	4624.	0.	-1078.	-2.
13.854	1.021	4756.	4794.	-38.	-1116.	-2.
13.875	1.042	4887.	4945.	-58.	-1174.	-2.
13.896	1.063	5018.	5081.	-63.	-1237.	-2.
12.917	1.083	5149.	5207.	-58.	-1294.	-2.
13.938	1.104	5281.	5325.	-44.	-1339.	-2.
13.958	1.125	5412.	5439.	-27.	-1365.	-2.
13.979	1.146	5543.	5551.	-8.	-1373.	-2.
14.000	1.167	5674.	5674.	0.	-1373.	-2.
14.021	1.188	5762.	5793.	-31.	-1404.	-2.
14.042	1.208	5850.	5912.	-58.	-1462.	-3.
14.063	1.229	5937.	5996.	-58.	-1519.	-3.
14.083	1.250	6025.	6083.	-58.	-1577.	-3.
14.104	1.271	6113.	6164.	-51.	-1628.	-3.
14.125	1.292	6201.	6239.	-38.	-1666.	-3.
14.146	1.313	6288.	6309.	-21.	-1687.	-3.
14.167	1.333	6376.	6376.	0.	-1687.	-3.
14.188	1.354	6407.	6440.	-33.	-1720.	-3.
14.208	1.375	6437.	6508.	-63.	-1783.	-3.
14.229	1.396	6468.	6559.	-91.	-1874.	-3.
14.250	1.417	6499.	6616.	-117.	-1991.	-3.
14.271	1.438	6538.	6619.	-98.	-2089.	-4.
14.292	1.458	6568.	6606.	-46.	-2134.	-4.
14.313	1.479	6591.	6608.	-17.	-2151.	-4.
14.333	1.500	6622.	6622.	0.	-2151.	-4.
14.354	1.521	6656.	6644.	13.	-2138.	-4.
14.375	1.542	6690.	6679.	11.	-2127.	-4.
14.396	1.563	6724.	6728.	-4.	-2131.	-4.
14.417	1.583	6758.	6771.	-13.	-2144.	-4.
14.438	1.604	6792.	6809.	-16.	-2161.	-4.
14.458	1.625	6827.	6837.	-10.	-2171.	-4.
14.479	1.646	6861.	6865.	-5.	-2175.	-4.
14.500	1.667	6895.	6895.	0.	-2175.	-4.
14.521	1.688	6916.	6923.	-7.	-2182.	-4.
14.542	1.708	6937.	6948.	-11.	-2194.	-4.
14.563	1.729	6957.	6970.	-13.	-2207.	-4.
14.583	1.750	6978.	6991.	-13.	-2219.	-4.
14.604	1.771	6999.	7010.	-11.	-2231.	-4.
14.625	1.792	7020.	7028.	-8.	-2239.	-4.
14.646	1.813	7041.	7045.	-4.	-2243.	-4.
14.667	1.833	7062.	7062.	0.	-2243.	-4.

HYDROGRAPH ROUTING

CHANNEL ROUTING -MODIFIED PULS- STATION 3 TO 4

ISTAO	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
4	1	0	0	0	0	1	0	0

ROUTING DATA

QLOSS	CLOSS	AVG	IRES	ISAME	IOPT	IPAP	LSTR
0.0	0.000	0.00	1	1	0	0	0

NSTPS	NSTOL	LAG	AMSKK	X	TSK	STORA	ISPRAT
1	0	0	0.000	0.000	0.000	0.	0

NORMAL DEPTH CHANNEL ROUTING

SNEL1	SNEL2	SNEL3	ELMXI	ELMAX	ELMIN	SEL
.1600	.0493	.1200	297.0	290.0	156.	.00600

CROSS SECTION COORDINATES--STA,ELEV,STA,ELEV--ETC

0.00 293.00 159.00 280.00 498.00 261.00 900.00 297.00 925.00 297.00
939.00 261.00 709.10 280.00 1150.00 290.00

STORAGE	0.00	.19	.46	.74	1.14	2.11	3.36	4.79	6.50	8.48
	10.73	13.24	15.67	19.16	22.62	26.69	31.30	36.71	42.65	49.22
OUTFLOW	0.00	170.02	578.60	1310.03	2444.42	4050.91	6209.49	8902.66	12660.11	16699.98
	21749.93	27679.71	34339.41	42303.81	50217.17	59589.72	70756.67	83744.82	98636.90	113541.06
STAGE	257.00	259.74	262.47	265.21	267.93	269.68	267.42	269.16	270.89	272.63
	274.37	276.11	277.84	279.58	281.32	283.05	284.79	286.53	288.26	290.00
FLOW	0.00	170.02	578.60	1310.03	2444.42	4050.91	6209.49	8902.66	12660.11	16699.98
	21749.93	27679.71	34339.41	42303.81	50217.17	59589.72	70756.67	83744.82	98636.90	113541.06

STATION 4, PLAN 1, RTIO 4

OUTFLOW

0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	1.	1.	2.	5.
10.	19.	32.	49.	71.	96.	123.	152.	181.	210.
235.	265.	281.	300.	316.	331.	342.	353.	361.	360.
376.	379.	384.	389.	399.	420.	454.	516.	617.	837.
1232.	2341.	4517.	5690.	6312.	6664.	6043.	7045.	5451.	5361.
9694.	5746.	6025.	6246.	6959.	7633.	8068.	10174.	10648.	10450.
10309.	9000.	9155.	8296.	7402.	8009.	6145.	5732.	5452.	4960.
4607.	4191.	3743.	3247.	2764.	2297.	1806.	1526.	1246.	1018.
837.	695.	596.	520.	485.	450.	420.	392.	360.	343.
322.	301.	275.	240.	235.	219.	205.	192.	179.	160.
157.	150.	145.	140.						

STOR

0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	1.
1.	1.	2.	3.	3.	4.	4.	4.	3.	3.
3.	3.	3.	3.	4.	4.	5.	5.	6.	6.
5.	5.	5.	4.	4.	4.	3.	3.	3.	3.
3.	2.	2.	2.	2.	1.	1.	1.	1.	1.
1.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.						

STAGE

257.0	257.0	257.0	257.0	257.0	257.6	257.0	257.0	257.0	257.0
257.0	257.0	257.0	257.0	257.0	257.0	257.0	257.0	257.0	257.0
257.0	257.0	257.0	257.0	257.0	257.0	257.0	257.0	257.0	257.0
257.0	257.0	257.0	257.0	257.0	257.0	257.0	257.0	257.0	257.3
257.0	257.0	257.0	257.0	257.0	257.6	257.6	257.8	257.6	257.1
257.1	257.2	257.3	257.5	257.7	258.0	258.3	258.6	258.6	258.9
259.0	259.1	259.2	259.3	259.4	259.4	259.5	259.5	259.5	259.6
259.6	259.6	259.6	259.7	259.7	259.8	259.9	260.2	263.6	261.4
263.0	263.0	266.1	267.0	267.5	267.7	267.0	268.0	266.6	266.7
267.0	267.0	267.3	267.6	267.8	268.3	263.1	269.7	270.0	269.9
269.9	269.6	269.2	268.7	269.2	267.8	267.6	267.0	268.7	268.4
266.1	265.6	265.4	264.8	264.3	263.7	263.1	262.5	262.3	261.5
261.1	260.8	260.5	260.3	260.1	259.9	259.8	259.7	259.6	259.5
259.4	259.3	259.2	259.1	259.0	258.9	258.9	258.8	258.8	258.7
258.6	258.5	258.5	258.4						

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	10660.	6250.	1710.	1710.	247459.
CMS	302.	177.	49.	49.	7007.
INCHES		20.79	22.04	22.04	22.04
MM		528.11	560.05	560.05	560.05
AC-FT		3103.	3409.	3409.	3409.
THOUS CU M		3828.	4204.	4204.	4204.

MAXIMUM STORAGE = 6.

MAXIMUM STAGE IS 270.0

HYDROGRAPH ROUTING

CHANNEL ROUTING -MODIFIED PULS- STATION 4 TO 5

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
5	1	0	0	0	0	1	0	0

ROUTING DATA

QLOSS	CLOSS	AVG	IRES	ISAME	IOPT	IPMP	LSTR
0.0	0.000	0.36	1	1	0	0	0

NSTPS	NSTDL	LAG	AMSKK	X	TSK	STORA	ISPRAT
1	0	0	0.000	0.000	0.000	0.	0

NORMAL DEPTH CHANNEL ROUTING

QN(1)	QN(2)	QN(3)	ELNVT	ELMAX	RLNTH	SEL
.0450	.0490	.0490	290.0	280.0	2250.	.00460

CROSS SECTION COORDINATES--STA,ELEV,STA,ELEV--ETC
0.00 240.00 1000.00 266.00 1150.00 253.00 1150.00 250.00 1175.00 250.00
1175.00 293.00 1200.00 260.00 1600.00 280.00

STORAGE	0.00	2.04	4.10	9.18	19.31	34.50	54.75	80.00	115.03	157.64
	208.61	267.95	335.67	411.75	496.21	589.03	690.23	799.79	917.73	1044.03
OUTFLOW	0.00	107.54	303.90	718.06	1611.79	3200.02	5692.95	9014.95	13746.53	20255.06
	20773.64	39534.49	52761.01	68671.13	87469.97	109390.67	134531.24	163176.02	195476.32	231610.85
STAGE	250.00	251.59	253.16	254.74	256.32	257.89	259.47	261.05	262.63	264.21
	265.79	267.37	268.95	270.53	272.11	273.68	275.26	276.84	278.42	280.00
FLOW	0.00	103.54	304.90	719.06	1611.79	3200.02	5692.85	9014.95	13746.53	20255.06
	20773.64	39534.49	52761.01	68671.13	87469.97	109358.67	134531.24	163176.02	195476.32	231610.85

STATION 5, PLAN 1, RTIO 4

OUTFLOW

0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	3.
0.	0.	0.	0.	0.	0.	0.	1.	1.	3.
9.	10.	10.	30.	45.	65.	88.	119.	150.	180.
216.	241.	265.	285.	304.	318.	331.	343.	353.	361.
368.	374.	379.	384.	391.	404.	428.	469.	529.	603.
929.	1577.	3129.	4931.	5916.	6449.	6732.	6954.	6330.	5404.
5524.	5705.	5975.	6119.	6524.	7166.	8168.	9451.	10393.	10555.
10426.	10142.	9533.	8756.	7945.	7198.	6541.	5995.	5574.	5195.
4022.	4434.	4807.	3538.	3063.	2616.	2176.	1782.	1464.	1208.
993.	822.	699.	598.	533.	486.	449.	419.	391.	366.
342.	329.	295.	268.	247.	231.	215.	202.	189.	176.
165.	156.	149.	144.						

STOR

0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	1.	1.	1.	2.	2.	3.	3.
3.	3.	4.	4.	4.	4.	4.	5.	5.	5.
5.	5.	5.	5.	5.	5.	6.	6.	7.	8.
12.	19.	34.	49.	57.	61.	63.	65.	68.	53.
51.	55.	56.	58.	61.	66.	74.	84.	91.	92.
91.	89.	85.	79.	72.	67.	61.	57.	54.	51.
49.	44.	41.	37.	33.	29.	25.	21.	18.	15.
12.	10.	9.	8.	7.	6.	6.	5.	5.	5.
5.	4.	4.	4.	3.	3.	3.	3.	3.	3.
3.	3.	2.	2.						

STAGE

250.0	250.0	250.0	250.0	250.0	250.0	250.0	250.0	250.0	250.0
250.0	250.0	250.0	250.0	250.0	250.0	250.0	250.0	250.0	250.0
250.0	250.0	250.0	250.0	250.0	250.0	250.0	250.0	250.0	250.0
250.0	250.0	250.0	250.0	250.0	250.0	250.0	250.0	250.0	250.0
250.0	250.0	250.0	250.0	250.0	250.0	250.0	250.0	250.0	250.0
250.1	250.2	250.3	250.5	250.7	251.0	251.3	251.7	252.0	252.2
252.4	252.6	252.8	253.0	253.1	253.2	253.2	253.3	253.3	253.4
253.4	253.4	253.4	253.4	253.5	253.5	253.6	253.8	254.0	254.5
255.1	256.3	257.8	259.0	259.6	259.8	260.0	260.1	259.6	259.3
259.4	259.5	259.6	259.7	259.9	260.2	260.6	261.2	261.5	261.6
261.5	261.4	261.2	260.9	260.5	260.2	259.9	259.6	259.4	259.2
258.9	258.7	258.4	258.1	257.8	257.3	256.9	256.5	256.1	255.6
255.2	254.9	254.6	254.3	254.0	253.8	253.7	253.6	253.5	253.4
253.3	253.2	253.1	252.8	252.7	252.6	252.4	252.3	252.2	252.1
252.1	252.0	251.9	251.9						

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	10555.	6252.	1717.	1717.	247202.
CMS	299.	177.	49.	49.	7062.
INCHES		20.77	22.82	22.82	22.82
MM		527.50	579.64	579.64	579.64
AC-FT		3100.	3406.	3406.	3406.
THOUS CU M		3824.	4201.	4201.	4201.

MAXIMUM STORAGE = 92.

MAXIMUM STAGE IS 261.6

PEAK FLOW AND STORAGE (END OF PERIOD) SUMMARY FOR MULTIPLE PLAN-RATIO ECONOMIC COMPUTATIONS
FLOWS IN CUBIC FEET PER SECOND (CUBIC METERS PER SECOND)
AREA IN SQUARE MILES (SQUARE KILOMETERS)

OPERATION	STATION	AREA	PLAN	RATIOS APPLIED TO FLOWS RATIO 1 .15	RATIO 2 .25	RATIO 3 .56	RATIO 4 1.00
HYDROGRAPH AT	1	2.00	1	1981.	2635.	5271.	10542.
	(	7.25)	(	44.78)(	74.63)(	149.26)(	298.52)(
ROUTED TO	2	2.00	1	2610.	3990.	8574.	18888.
	(	7.25)	(	73.91)(	112.71)(	186.17)(	306.04)(
ROUTED TO	3	2.00	1	4538.	5984.	6542.	10633.
	(	7.25)	(	128.50)(	167.18)(	185.25)(	301.09)(
ROUTED TO	4	2.00	1	4512.	5858.	6528.	10660.
	(	7.25)	(	127.77)(	165.87)(	184.87)(	301.86)(
ROUTED TO	5	2.00	1	4489.	5836.	6489.	10555.
	(	7.25)	(	127.81)(	165.27)(	183.49)(	298.88)(

BREACH ANALYSIS

SUMMARY OF DAM SAFETY ANALYSIS

PLAN 1 .....

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	288.30	288.30	294.30
STORAGE	230.	330.	482.
OUTFLOW	0.	0.	1848.

RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
.15	294.59	.29	486.	2618.	.39	17.00	16.50
.25	294.46	.16	485.	4013.	.33	16.72	15.67
.50	294.50	.20	437.	6574.	.39	16.67	14.50
1.00	294.91	.61	413.	10000.	.56	16.33	13.33

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SUMMARY OF DAM SAFETY ANALYSIS

PLAN 4 .....

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	266.20	266.20	272.20
STORAGE	65.	65.	147.
OUTFLOW	0.	0.	1488.

RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
.15	272.57	.37	154.	4542.	.38	17.31	16.83
.25	272.64	.44	155.	5904.	.42	16.83	16.00
.50	272.62	.42	155.	6542.	.40	16.67	14.33
1.00	273.15	.95	164.	10633.	.48	16.50	13.67

PLAN 1 STATION 4

RATIO	MAXIMUM FLOW,CFS	MAXIMUM STAGE,FT	TIME HOURS
.15	4512.	266.1	17.50
.25	5850.	267.1	16.83
.50	6528.	267.6	16.67
1.00	10660.	270.0	16.50

PLAN 1 STATION 5

RATIO	MAXIMUM FLOW,CFS	MAXIMUM STAGE,FT	TIME HOURS
.15	4485.	258.7	17.50
.25	5836.	259.5	16.83
.50	6489.	259.8	16.83
1.00	10555.	261.6	16.67

SKYLINE LANE DAM #2

Dam Application No. 399
(23-73)

State of New Jersey

State Water Policy Commission

REPORT ON DAM APPLICATION

To the State Water Policy Commission,
State of New Jersey.

Gentlemen:

The application of Realty Acquisition Co., N.E. Winston, President, 22 W. 48th St., N.Y.

filed June 29, 1945 for approval of plans and for a permit to construct a dam

known as Skyline Lake (Dam #2) near Wanaque on Shephard Brook

tributary to Wanaque River in Passaic County New Jersey,

has been examined by George R. Shanklin, Hydraulic [illegible] Engineer.

PRINCIPAL FEATURES

Location 23.31.2.6.4

Site inspected 7/27/45 - G.R.S.

Purpose of dam Real Estate Development

Length of dam 730 feet

Drainage area 2.3 sq. mi.

Elevation of flow line 122.0 assumed datum

Area of Lake 65 acres

Capacity of lake 127 Mill. gals.

Type of dam Earth fill, steel sheet piling core wall.

Top width 9 feet

Upstream slope 2 to 1

Downstream slope 2 to 1

Foundation material Sand & gravel with blue clay

Max. height 22.0 feet

Type of spillway Concrete wall with spillway channel below

Length of spillway 50 feet

Max. head on spillway 4.0 feet for 1.0 ft. free-board below top of core wall

Spillway capacity 755 sec. ft. 336 sec. ft. per sq. mi.

Estimated maximum flood flow 400 sec. ft. per sq. mi. (1934 Central Jersey Curve)

Outlets other than spillway 20-inch blowoff pipe to right of spillway

Drawings filed July 31, 1945 by Newell C. Harrison, Engineer, Butler, N. J.

It has been found that the site for the dam is suitable and the plans adequate to ensure the construction of a structure which will not be a menace to life or property. It is therefore recommended that the plans be approved and that a permit be issued, subject, however, to the following terms and conditions:—

1. That this permit does not give any property rights either in real estate or material, nor any exclusive privileges; neither does it authorize any injury to private property nor invasion of private rights, nor any infringement of Federal, State or local laws or regulations, nor does it waive the obtaining of Federal assent, when necessary.

D-42

SKYLINE LAKE DAM #2

RECEIVED

JUN 29 1945

STATE WATER POLICY COMMISSION

STATE OF NEW JERSEY

STATE WATER POLICY COMMISSION

28 WEST STATE STREET

TRENTON, NEW JERSEY

DAM APPLICATION No. 399

APPLICATION FOR PERMIT FOR CONSTRUCTION (23-73) OR REPAIR OF DAM

Section 23.31.2.9.4 ☐

Butler, Morris Co., N.J. New Jersey

June 27, 1945. 19.....

To the New Jersey State Water Policy Commission,

Gentlemen:—

In compliance with the provisions of Title 58, Chapter 4, Revised Statutes

Realty Acquisition Co. 22 East 48th. St. New York, N.Y. H.K. Finston, Pres.

(Here insert name and address of public authority, private person or corporation which will be the owner of the dam)

hereby makes application for the approval of drawings and for the issuance of a permit to construct (~~repair~~) a dam known as Skyline Lake (Dam #2)

(Here insert name of dam)

across Shephard Brook in Passaic County, New Jersey,

(Here insert name of stream)

at a point 1 mile upstream from Dam #1

(Here give location by distance from mouth of stream, county or municipal boundary or other political feature)

for the purpose of Real Estate Development

(Here state the purpose of the proposed lake)

in accordance with the following information and with the complete specifications and drawings filed with this application and made part hereof, as follows:

Area of water shed..... 2.6 square miles.

Maximum depth of lake..... approximately 20 feet

Area of water surface..... 65 acres

Capacity of spillway at 2½ feet head, is 67± cubic feet per second

The character of the foundation material is sand, gravel, clay and hardpan

As determined by test holes

D-43

SKYLINE LAKE DAM No. 2

2. That the work shall at all times be subject to supervision and inspection by representatives of the State Water Policy Commission and that no changes in plans and specifications as approved shall be made except with written consent of the Commission. The Commission however, reserves the right to require such changes or modifications in the plans and specifications as may be considered necessary, and further reserves the right to suspend or revoke this permit at any time should such action be deemed advisable in the interest of public safety.

3. That the work shall be under the direction of a competent engineer, and that he or a competent representative shall be on the ground daily during the construction and until the completion of the dam.

4. That the Commission shall be notified in advance of the proposed time of the commencement of this work; that no material shall be placed on any portion of the foundation until such portion of the foundation has been approved in writing by a representative of the Commission.

5. That a report, on forms to be submitted by the Commission, on the status of the construction work shall be mailed to the State Water Policy Commission, 28 West State Street, Trenton, New Jersey, on the first day of each month until the work upon the dam has been completed.

6. That no brush or waste timber cleared from the area under this approval shall be burned unless and until the party doing the work shall have obtained a permit from the Firewarden of the district in which the burning is to be done, in accordance with Title 13:9-19 of the Revised Statutes.

7. That no flashboards or other obstruction shall be placed or permitted to remain on the crest of the spillway.

8. That the work shall be started within one year from date of this permit and completed within two years from said date; otherwise, this permit, if not previously revoked or specifically extended, shall cease and be null and void.

9. This permit shall not become operative unless and until the applicant shall file with the Commission within thirty days from date hereof, upon a form furnished by the Commission, its written acceptance of the terms and conditions hereby imposed.

10. Drawings hereby approved are sheets Nos. 2, 4 and 5, Dam 2, together with title sheet entitled "Plan and Profile for Construction of Dams at Skyline Lake, Borough of Ringwood, Passaic County, July 10, 1945".

No Rule "S" Acknowledgment Issued.

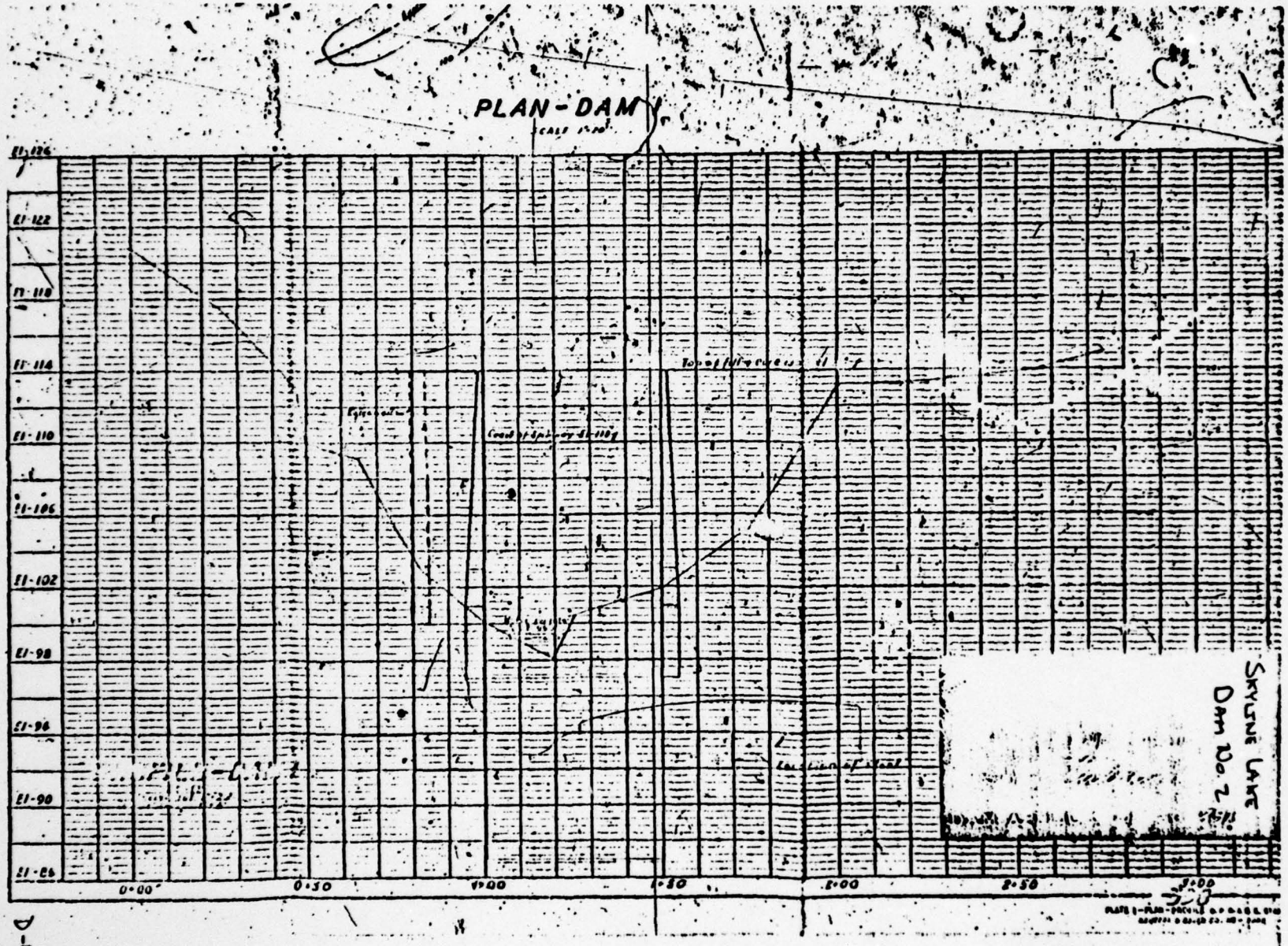
George R. Hamblin
Hydraulic ~~Assistant~~ Engineer.

W. T. Cocklin
~~Assistant~~ Chief Engineer

Trenton New Jersey,

July 31, 1945

D-44


PLAN - DAM
El. 126
El. 122
El. 118
El. 114
El. 110
El. 106
El. 102
El. 98
El. 94
El. 90
El. 86
0+00
0+50
1+00
1+50
2+00
2+50
3+00
SKYLINE LAKE
Dam No. 2

SHT 4

Form 1860-12-39

SKYLINE LAKE DAM No. 1

Dam Application No. 389
(23-72)

State of New Jersey
State Water Policy Commission

REPORT ON DAM APPLICATION

To the State Water Policy Commission,
State of New Jersey.

Gentlemen:

The application of Realty Acquisition Company, E. K. Winston, President, 22 West 48th Street, New York City
filed June 29, 1945 for approval of plans and for a permit to construct a dam known as Skyline Lake (Dam #1) near Wanaque on Shephard Brook tributary to Wanaque River in Passaic County, New Jersey, has been examined by George R. Shanklin, Hydraulic ~~Assistant Division~~ Engineer.

PRINCIPAL FEATURES

Location 23.31.3.3.1 ☐		Site inspected 7/27/45 - G.R.S.	
Purpose of dam	Real Estate Development	Length of dam	160 feet
Drainage area	2.9 sq. mi.	Elevation of flow line	110.0 assumed datum
Area of Lake	35± acres	Capacity of lake	45± Mill. gals.
Type of dam	Earth fill. Steel sheet piling core wall.	Top width	8 feet
Upstream slope	2 to 1	Downstream slope	2 to 1
Foundation material	Sand & gravel with blue clay	Max. height	16.0 feet
Type of spillway	Concrete Cree overflow	Length of spillway	50 feet

Max. head on spillway 3.0 feet for 1.0 free-board below top of dam and core wall

Spillway capacity 905 sec. ft.— 312 sec. ft. per sq. mi.

Estimated maximum flood flow 295 sec. ft. per sq. mi. (1.5% Central Jersey Curve)

Outlets other than spillway 20-inch blowoff pipe to left of spillway

Drawings filed July 31, 1945 by Newell C. Harrison, Engineer, Butler, N. J.

It has been found that the site for the dam is suitable and the plans adequate to ensure the construction of a structure which will not be a menace to life or property. It is therefore recommended that the plans be approved and that a permit be issued, subject, however, to the following terms and conditions:—

1. That this permit does not give any property rights, either in real estate or material, nor any exclusive privileges; neither does it authorize any injury to private property nor invasion of private rights, nor any infringement of Federal, State or local laws or regulations, nor does it waive the obtaining of Federal assent, when necessary.

D-46

Skyline Lake Dam N[illegible]

RECEIVED
JUN 29 1945
STATE WATER POLICY COMMISSION

STATE OF NEW JERSEY

STATE WATER POLICY COMMISSION

28 WEST STATE STREET
TRENTON, NEW JERSEY

DAM APPLICATION No. 398

APPLICATION FOR PERMIT FOR CONSTRUCTION (23-72) OR REPAIR OF DAM

location 23.31.5.3.1

Butler, Morris Co. New Jersey

June 27, 1945

To the New Jersey State Water Policy Commission.

Gentlemen:—

In compliance with the provisions of Title 58, Chapter 4, Revised Statutes Realty Acquisition Co. 22 West 82th. St. New York, N.Y. [illegible] Flaston, Pres.
(Here insert name and address of public authority, private person or corporation which will be the owner of the dam)
hereby makes application for the approval of drawings and for the issuance of a permit to construct [illegible] a dam known as Skyline Lake (Dam #1)
(Here insert name of dam)
across Shepherd Brook in Passaic County, New Jersey.
(Here insert name of stream)
at a point approximately 2000 ft. northerly of boundary line of Ringwood & Pequannock Boros.
(Here give location by distance from mouth of stream, county or municipal boundary or other points of feature)
for the purpose of Real Estate Development
(Here state the purpose of the proposed lake)
in accordance with the following information and with the complete specifications and drawings filed with this application and made part hereof, as follows:

Area of water shed 2.9 square miles

Maximum depth of lake 12 feet

Area of water surface approximately 38 acres

Capacity of spillway at 2½ feet head, is 685 cubic feet per second.

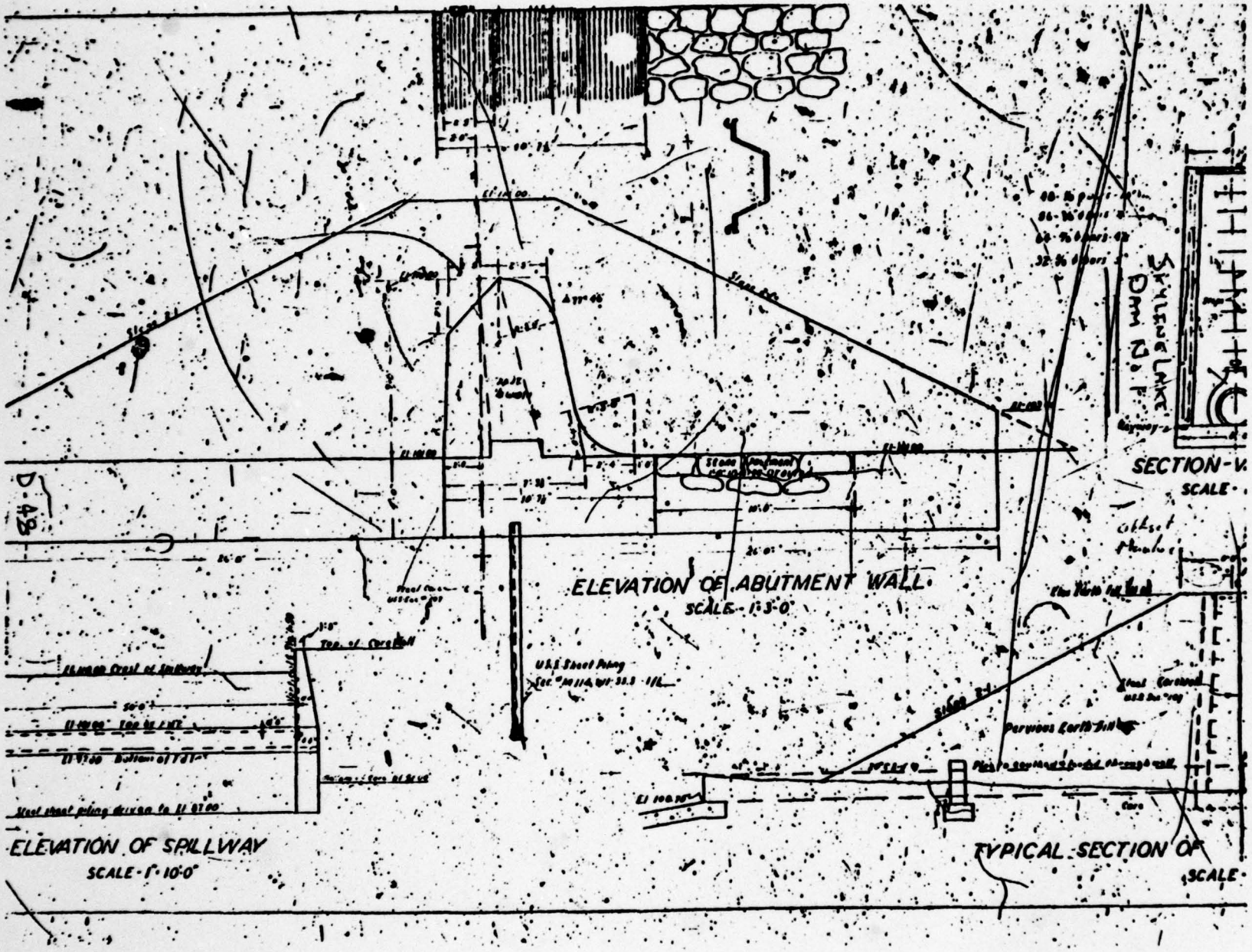
The character of the foundation material is sand, gravel, clay and hard-pan.

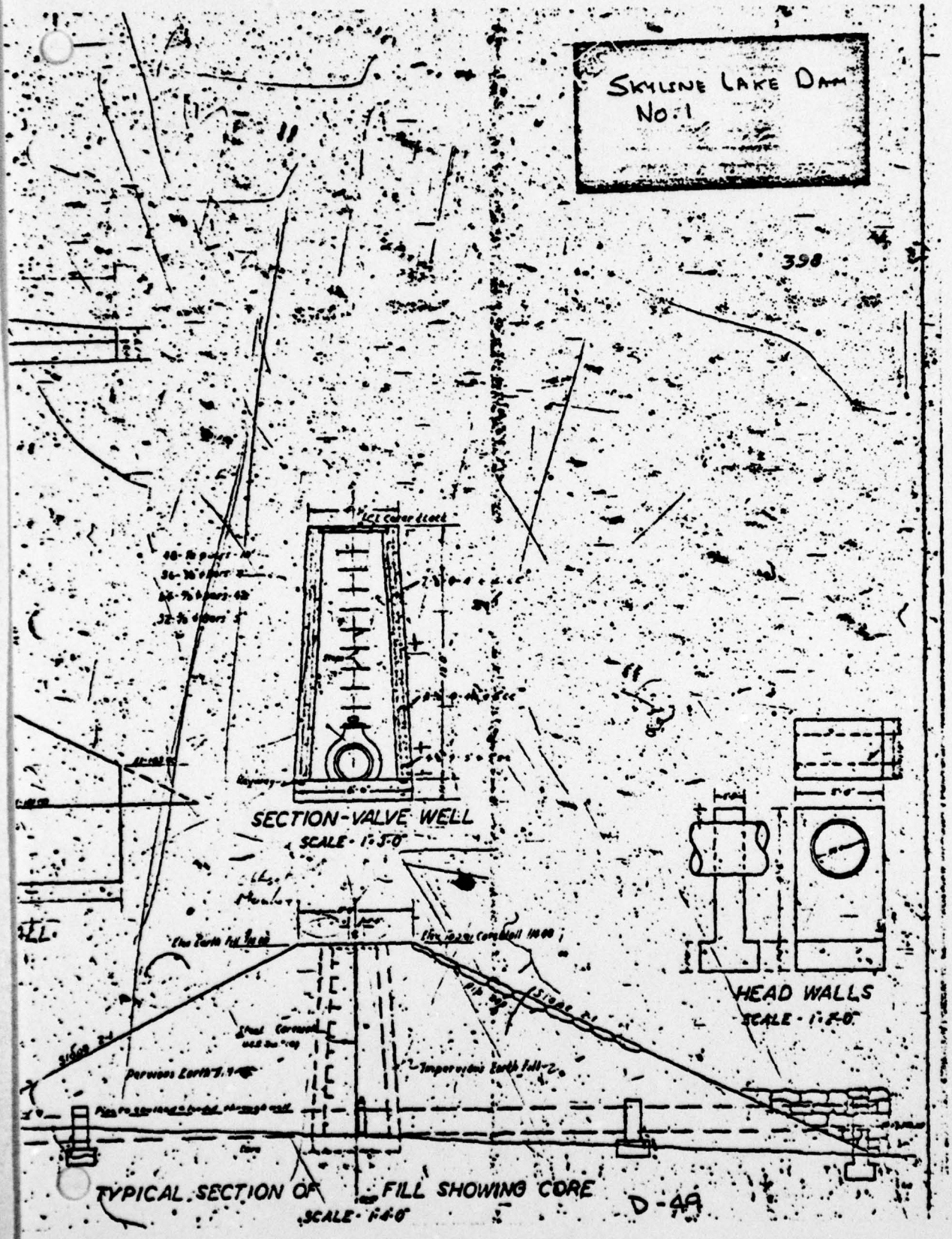
As determined by test holes

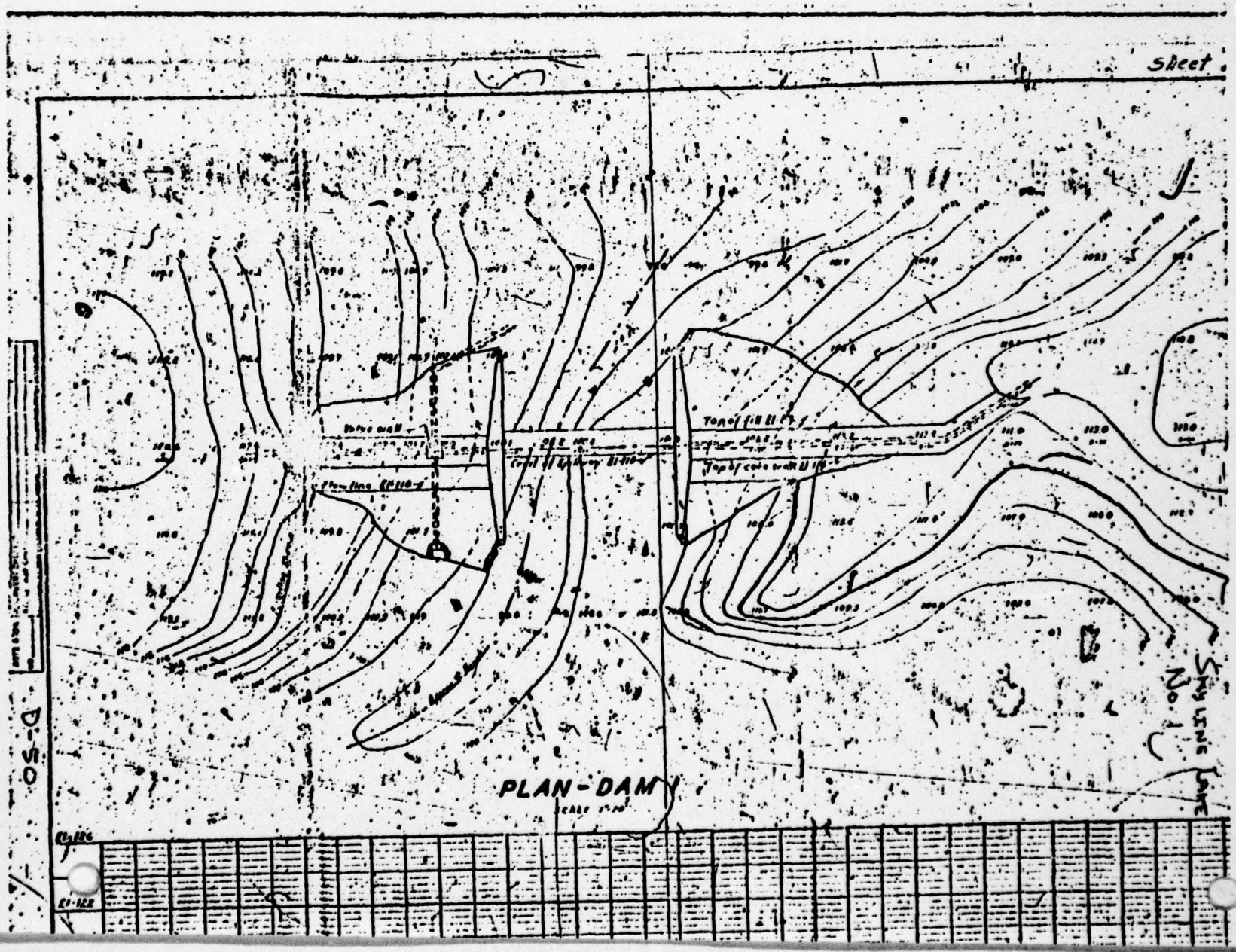
See App 399 for general correspondence + location map prior to filing of application

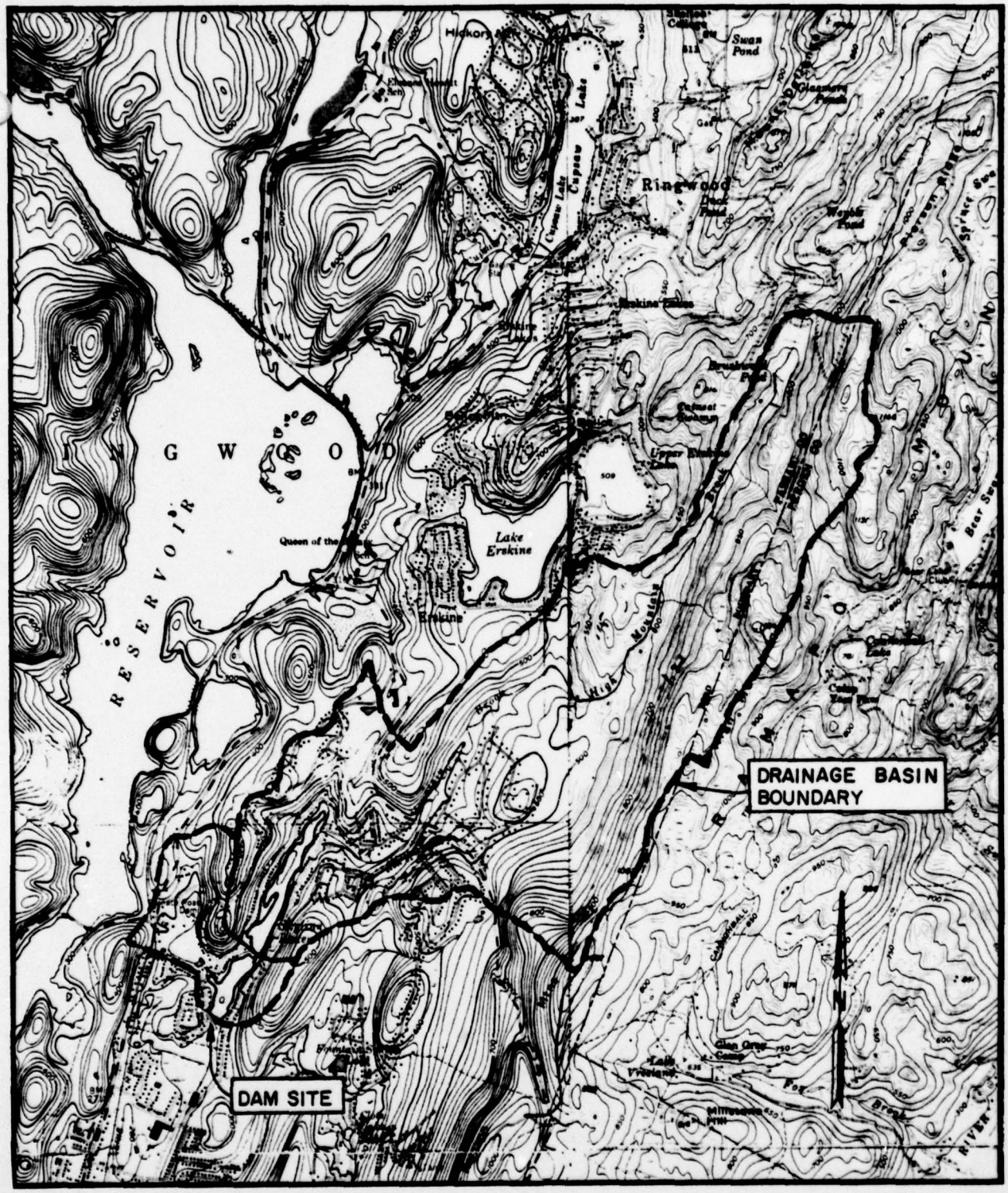
[illegible]

D-47


ELEVATION OF ABUTMENT WALL
SCALE - 1'-0"
ELEVATION OF SPILLWAY
SCALE - 1" = 10'-0"
TYPICAL SECTION OF
SECTION-V
SCALE -
D-48


SKYLINE LAKE DAM
NO. 1
398
SECTION - VALVE WELL
SCALE - 1:5-0
HEAD WALLS
SCALE - 1:5-0
TYPICAL SECTION OF FILL SHOWING CORE
SCALE - 1:40
D-49


Sheet
PLAN - DAM
D-50



1000 0 1000 2000 3000 4000 5000 6000

SCALE IN FEET

AREA LOCATION

SKYLINE LAKE DAM NO. 1

JENNY-LEEDSHILL JANUARY 1979

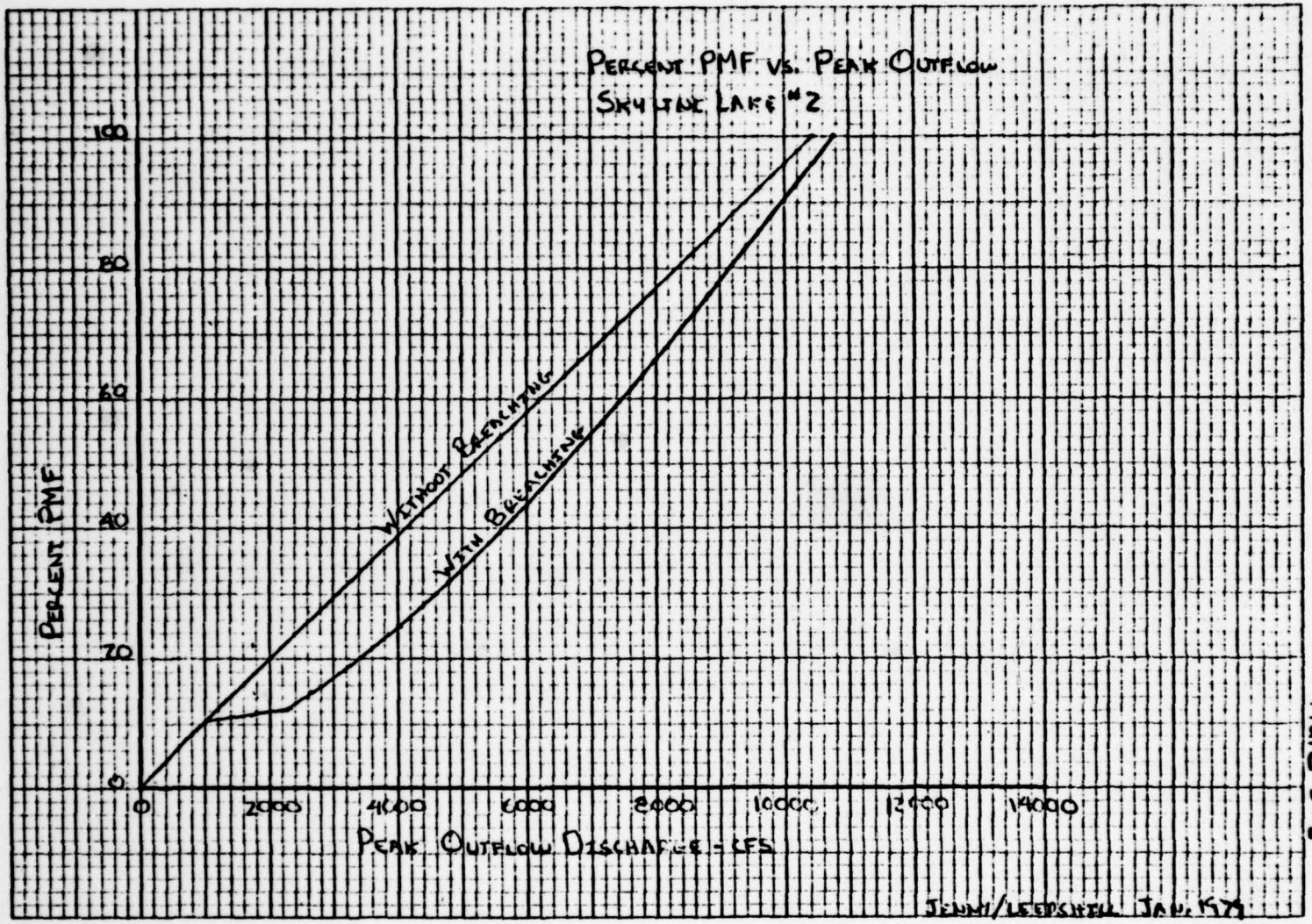

PERCENT PMF VS. PEAK OUTFLOW
SKY LAKE #2
WITHOUT BREACHING
WITH BREACHING
PERCENT PMF
0
20
40
60
80
100
0
2000
4000
6000
8000
10000
12000
14000
PEAK OUTFLOW DISCHARGE - CFS
JENNI/LEESMITH JAN. 1978

Plate D-2

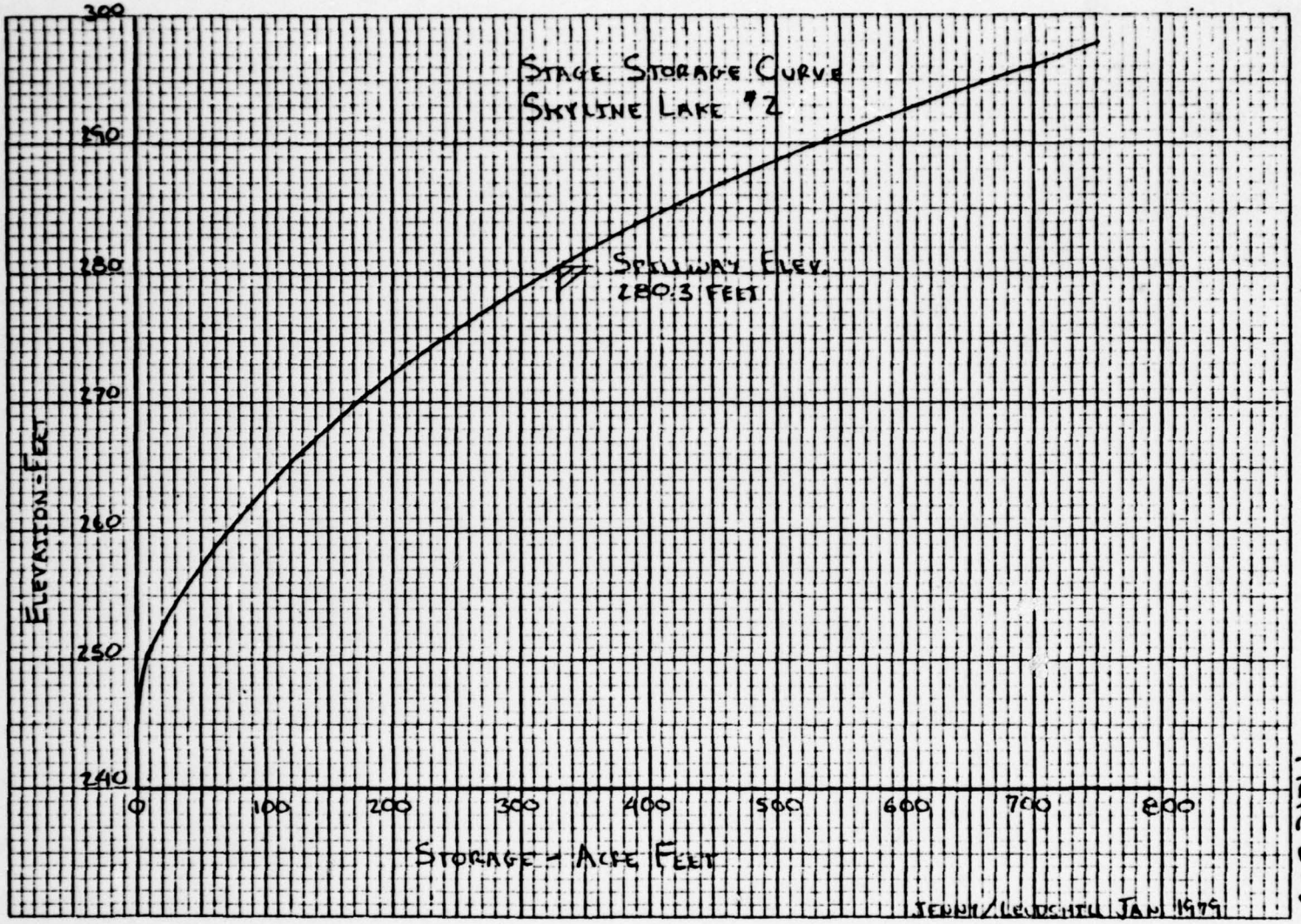

STAGE STORAGE CURVE
SKYLINE LAKE #2
SPILLWAY ELEV.
280.3 FEET
ELEVATION-FEET
300
290
280
270
260
250
240
0
100
200
300
400
500
600
700
800
STORAGE - ACRE FEET
JENNY/LEUDSTRU JAN 1979

Plate D-3

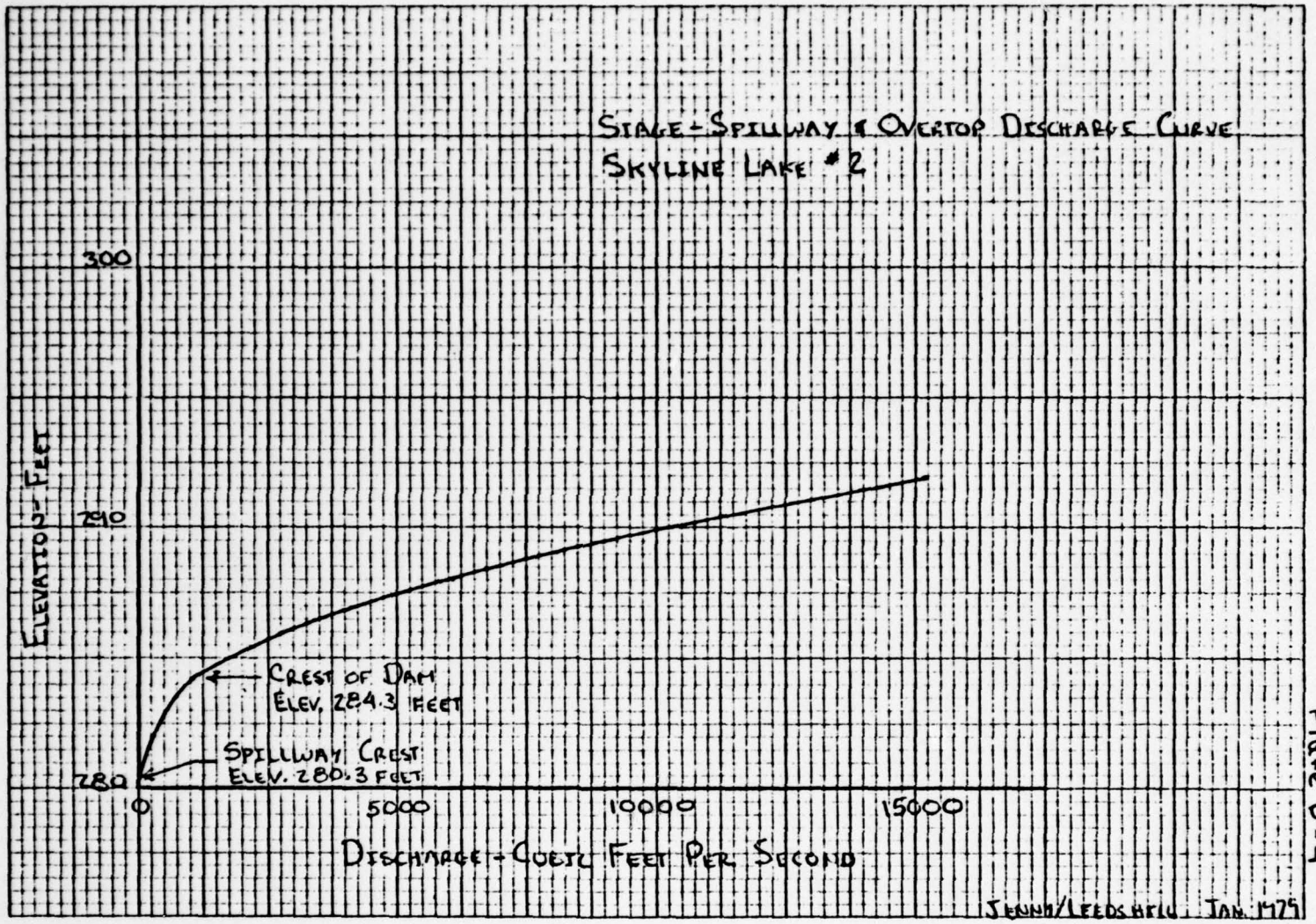

STAGE - SPILLWAY & OVERTOP DISCHARGE CURVE
SKYLINE LAKE #2
300
290
280
ELEVATION - FEET
CREST OF DAM
ELEV. 284.3 FEET
SPILLWAY CREST
ELEV. 280.3 FEET
0
5000
10000
15000
DISCHARGE - CUBIC FEET PER SECOND
JENNA/LEEDS HILL JAN. 1979

Plate D-4

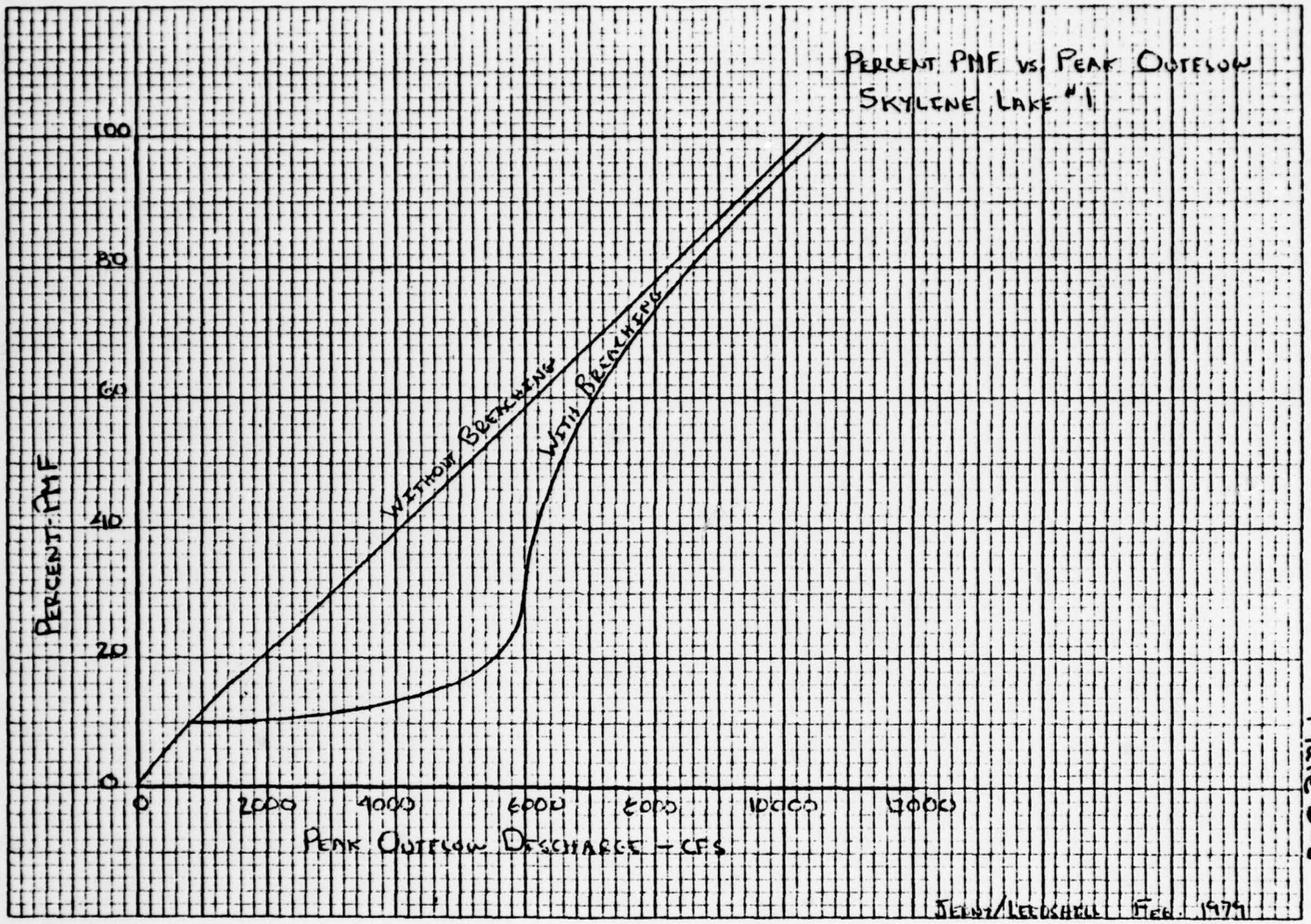
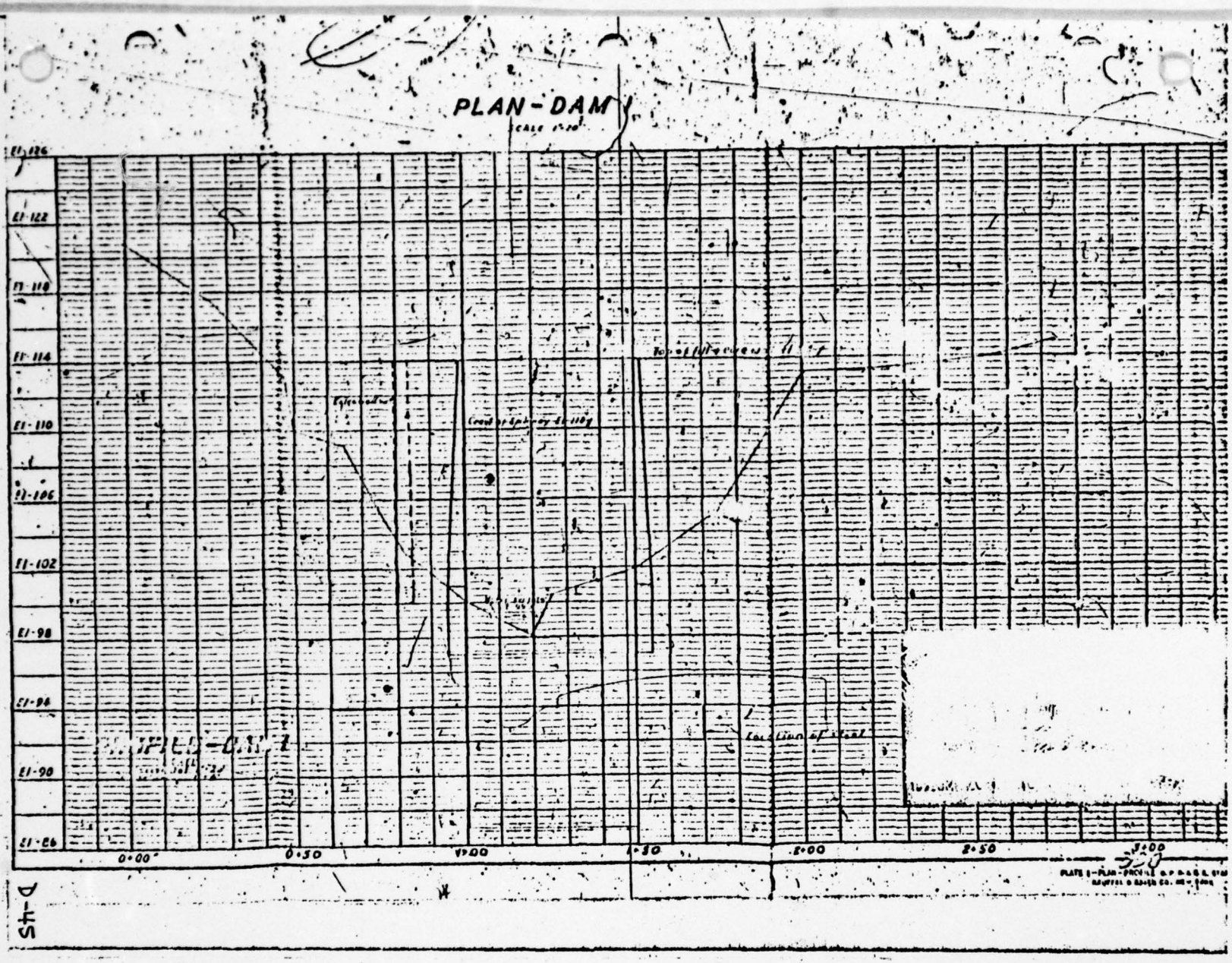

PERCENT PMF VS. PEAK OUTFLOW
SKYLINE LAKE #1
PERCENT PMF
100
80
60
40
20
0
WITHOUT BREACHING
WITH BREACHING
0
2000
4000
6000
8000
10000
12000
PEAK OUTFLOW DISCHARGE - CFS
JENNY/LEEDSHILL FEB. 1979

Plate D-5


PLAN - DAM
El. 126
El. 122
El. 118
El. 114
El. 110
El. 106
El. 102
El. 98
El. 94
El. 90
El. 86
0+00
0+50
1+00
1+50
2+00
2+50
3+00
Sta

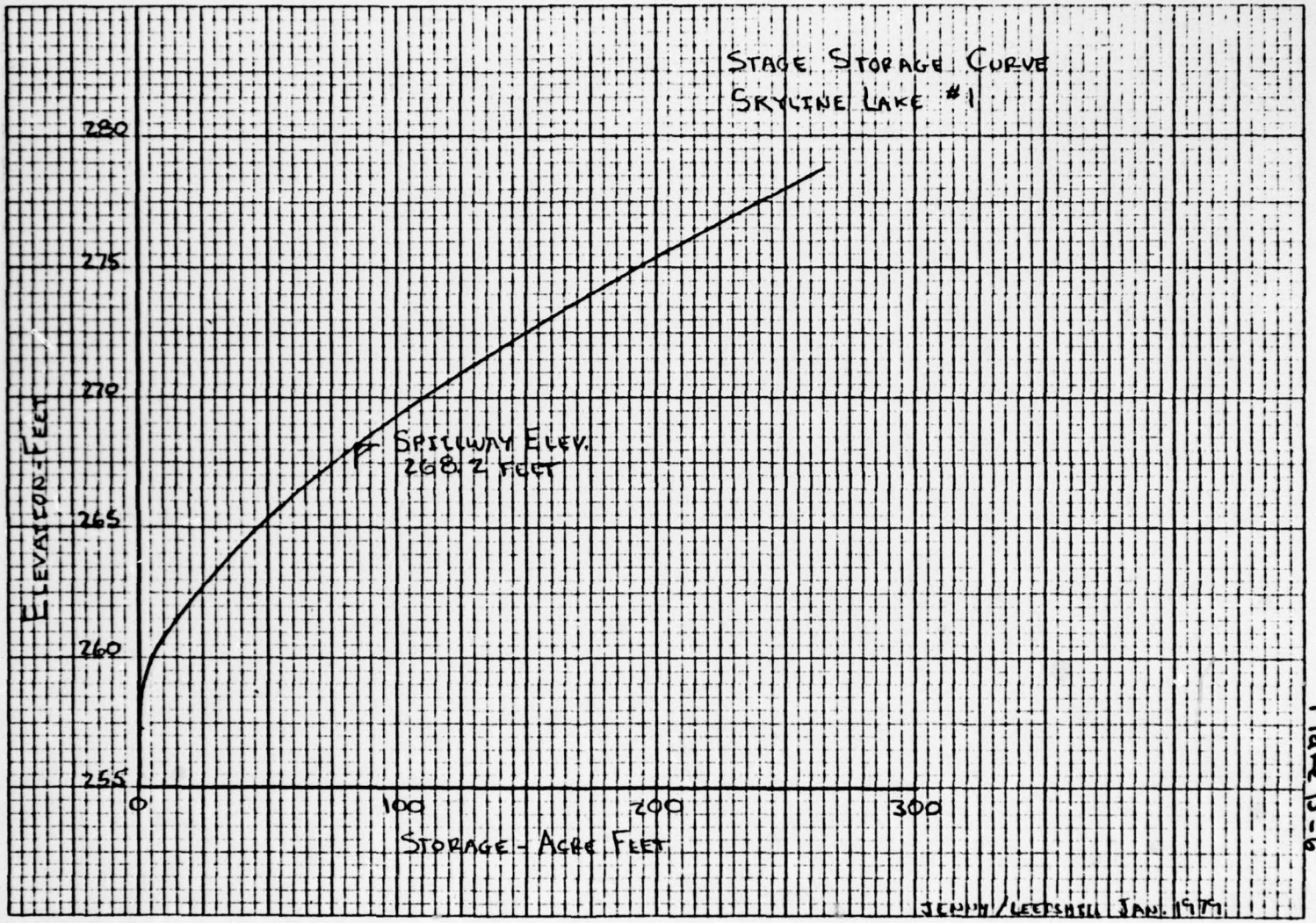

STAGE STORAGE CURVE
SKYLINE LAKE #1
280
275
270
265
260
255
ELEVATION-FEET
SPILLWAY ELEV.
2682 FEET
0
100
200
300
STORAGE - ACRE FEET
JENNY/LEEPSHILL JAN. 197

Plate D-6

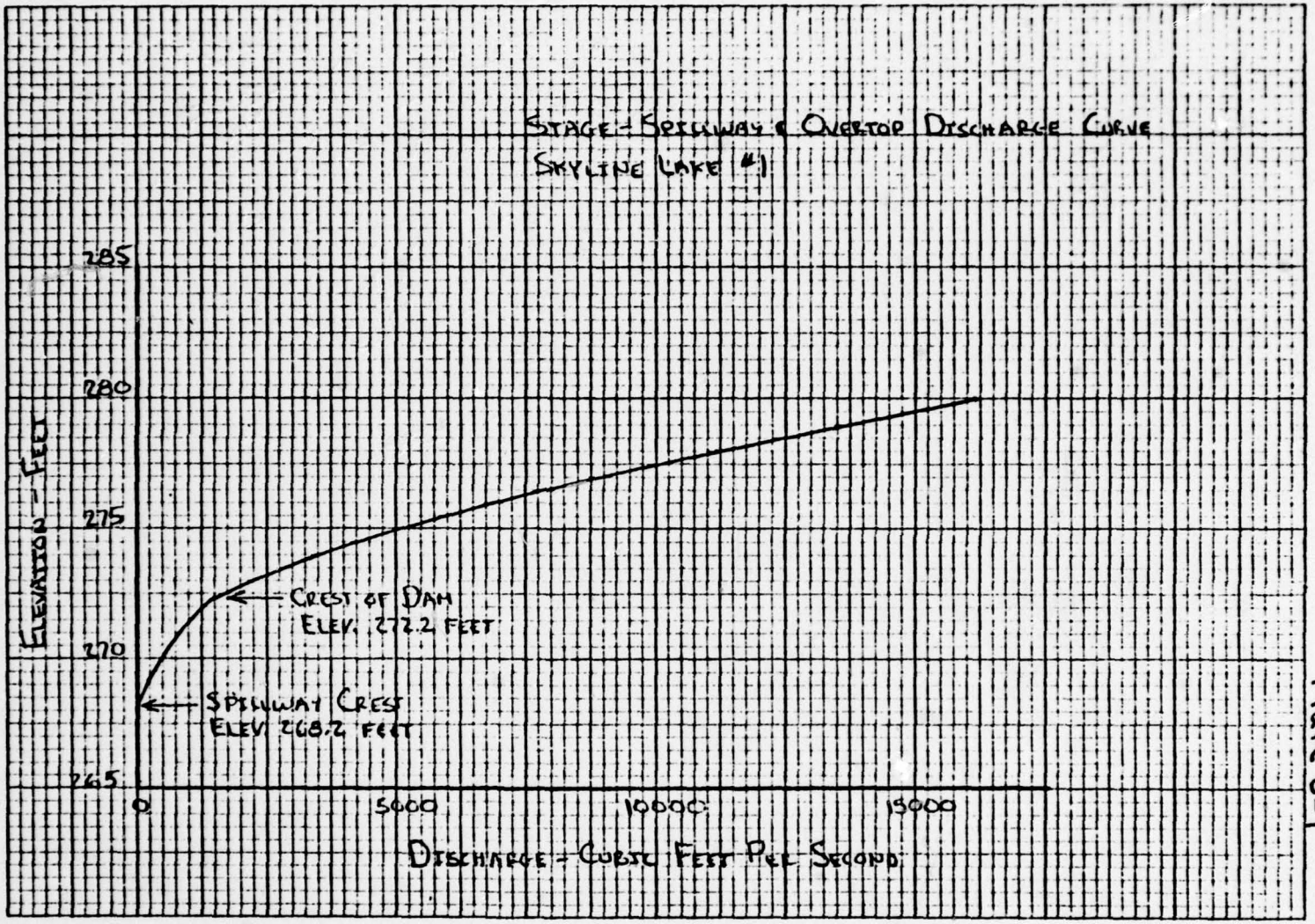

STAGE - SPILLWAY & OVERTOP DISCHARGE CURVE
SKYLINE LAKE #1
285
280
275
270
265
ELEVATION - FEET
CREST OF DAM
ELEV. 272.2 FEET
SPILLWAY CREST
ELEV. 268.2 FEET
0
5000
10000
15000
DISCHARGE - CUBIC FEET PER SECOND

Plate D-7